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News of the Industry Begins Page 268

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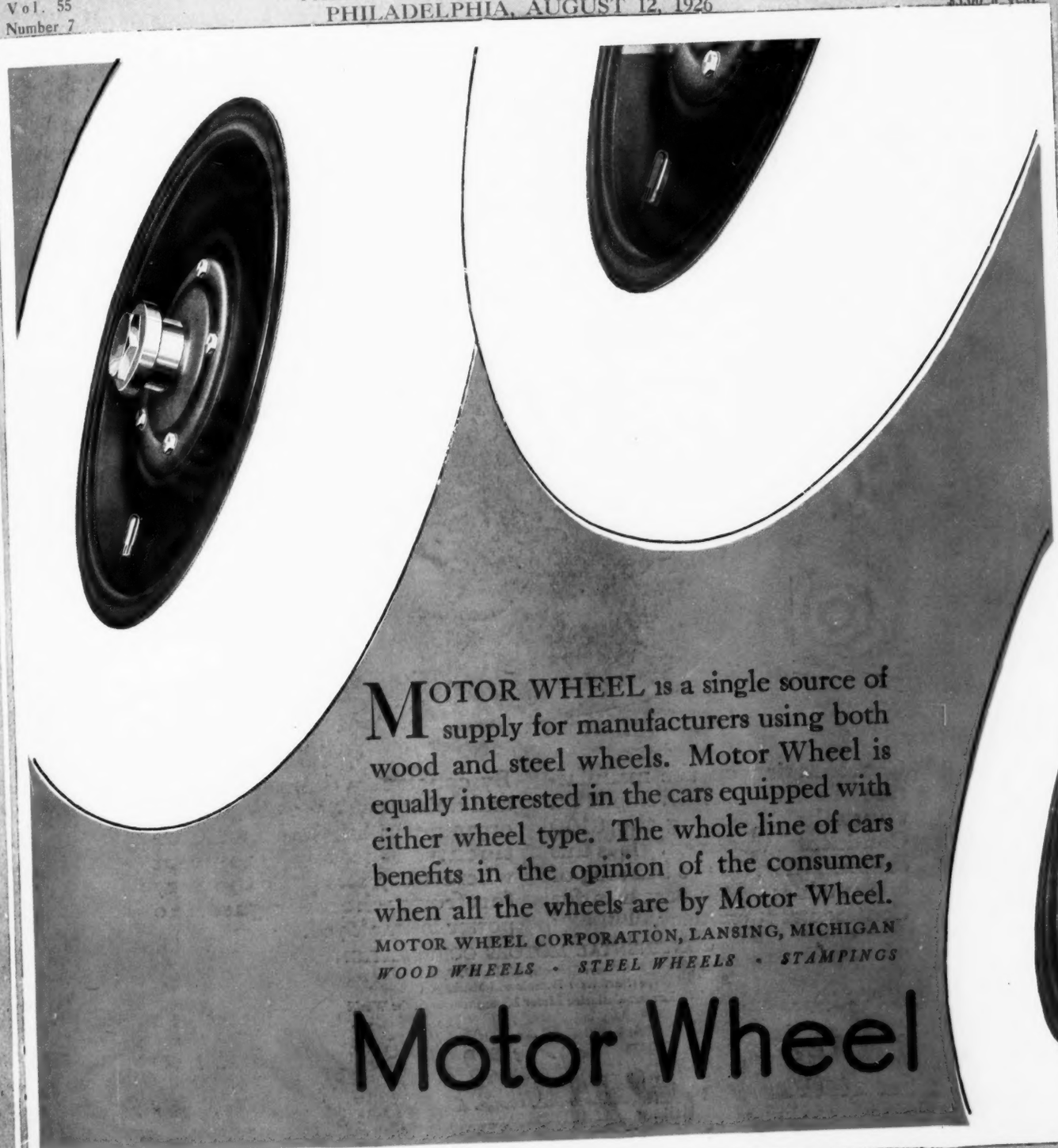
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AUTOMOTIVE INDUSTRIES

VOLUME 55 *Philadelphia, Thursday, August 12, 1926* NUMBER 7

More *Good* Truck Dealers Today Than Ever Before

Not enough to go around yet, but level of ability and standing is high among many groups of commercial car retailers. Survey brings to light average characteristics.

By Norman G. Shidle

EVERY truck manufacturer has met a lot of truck dealers. He has traveled through the various territories where his retailers are established, has seen their showrooms and sometimes has observed closely their selling methods. He may have gotten to know many of them by their first names and he probably has a pretty accurate record back home in the factory of what each one of them has sold over a period of time.

But isn't it possible that truck executive sometimes may have been looking at his dealers so much as individuals and so little as purely distribution outlets that he may not be entirely clear as to just what sort of fellow the average truck dealer is today? Ask a truck factory man a direct question in this regard and nine chances out of ten the picture of one or two personalities will come to his mind as he casts about to phrase his answer. Then the reply, when made, may be colored very much by the particular images which were called up at the moment. The woods-and-trees simile perhaps may be applied properly in many instances.

After all, the truck dealer is a distribution outlet, viewed from a coldly business standpoint. The kind of liquor he drinks, the kind of cigars he smokes, the quality of his golf game and his ability as a snappy-story raconteur have relatively little bearing on his effectiveness as a merchandising factor in the truck business. The type of question important to ask about the truck dealer is something like this:

Is he in business on a sound permanent basis, or is he, on the average, selling trucks to get what he can out of it in a year or two and then pass on to the next stop?

Does he tend to stick to one line of trucks long enough to put it over in a permanent way, or will he easily succumb to every high-powered sales talk he hears and change lines every few months?

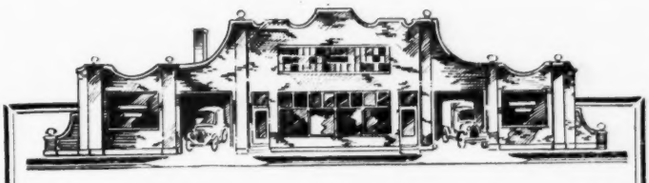
How much business can he do in a year on the average?

How many salesmen does he employ?

Does he handle any parts or accessory lines such as tires, tubes, brake lining, etc., which will bring some additional profits to help stabilize his profit and sales curve throughout the year?

Other vital questions could be added to the list, but those given form a reasonably good basis to start on in trying to judge the capacity and quality of the average truck dealer today. Plenty of generalities have been available to answer these queries for some time, but there has been a dearth, relatively speaking, of specific information on this subject.

Some rather interesting—and to some extent surprising—facts have just appeared as a result of a recent attempt to get some actual data about the truck dealer



An Average Good Truck Dealer as He Exists Today

He has been in business a little over 7 years.

He has been handling his present make of truck for about 6 years.

He did a gross business last year of about $59,000.

He employs 2 or 3 salesmen.

He has handled only 1 or 2 makes of truck since starting in business.

He sells one or more parts and accessory lines, such as tires, tubes, brake lining, batteries, tire chains, grease, oil or gasoline.

These specifications for an average good truck dealer as he exists today constitute averages compiled from data received in answer to questionnaires sent out to a list of truck dealers chosen at random representing a wide variety of makes, covering towns of all sizes and located in all parts of the United States.

today. Most of the surprising facts developed are pleasantly surprising, which in itself has an element of unexpectedness in it for anyone who has listened to the groans which have come very often from factories seeking for good dealers and having great difficulty in finding them. In fact, the difficulty of building a retail staff often has been so great as to raise questions as to the presence of sufficient good dealers to go around.

Probably there aren't enough ready-made dealers to serve everyone, but the recent studies referred to do indicate the existence of a growing body of worthwhile truck merchants who are likely to function effectively under a consistent factory sales policy.

This trend is illustrated by the soundness and stability which today marks a large part of truck dealer organizations. There are now something like 25,000 motor truck dealers in the United States and Canada, about 15,000 of whom are selling makes other than Fords. These 25,000 commercial car retailers last year each did an average gross business of nearly $22,000, as against an average of about $56,000 apiece for passenger car dealers.

25,000 Motor Truck Dealers

In this group of truck retailers appear a certain number of representatives who probably handle trucks only as a side line and who scarcely can be considered real merchandising forces in the truck industry. Even this group, however, must be counted as useful members of the trade in that they provide physical representation for the truck manufacturer in their locality and to that extent make it easier for prospects to purchase the particular truck they represent than otherwise would be possible.

The real status of the average good truck dealer, however, is strikingly indicated by the results of a questionnaire just compiled by *Commercial Car Journal*. Replies to this series of questions were received from 502 truck dealers, chosen at random among the subscribers to that publication, representing all makes of trucks, towns of various sizes and every section of the United States.

The group replying sold about $25,000,000 worth of trucks at retail last year, less than 8 per cent of the replies coming from Ford dealers while less than 5 per cent of the trucks sold by the group were sold by the Ford agents. Thus, the questionnaire results may fairly be taken as typical of present conditions among average, full-time truck merchants. Some unusually pertinent facts were developed from the survey. Here are some of them:

Eighty-nine per cent of these dealers have been in the truck business for three years or more. (Sixty-nine per cent have been in business for five years or more.)

Eighty-six per cent of these dealers have handled only one or two lines of trucks since starting in business.

Seventy-eight per cent have been handling the present line for three years or more.

These facts illustrate strikingly the degree of stability of the truck retail field at the present time. They tend to lay to rest the apparently unfair conception of the truck retailer as a migratory, uncertain sort of business man, who handles one line of products today and another tomorrow. In view of the relatively short time that there has been any truck industry at all from a straight commercial and marketing point of view, the fact that 89 per cent of a representative group of truck dealers has been in business for more than three years is good evidence of growing stability. *This is emphasized even more strongly by the average length of time of this group in business, which works out to 7.2 years.*

An average life of over 7 years is very high, even for a group admittedly somewhat above the average, as various types of retailers go. Definite figures are not available, but it is almost certain that data for many other lines of trade would show up far less favorably.

The members of this typical group of truck merchants have handled their present lines on the average for a little over 6 years, certainly long enough to have identified themselves with their merchandise, long enough to have built good will for the product in their communities and long enough to have become an integral part of the manufacturer's marketing organization.

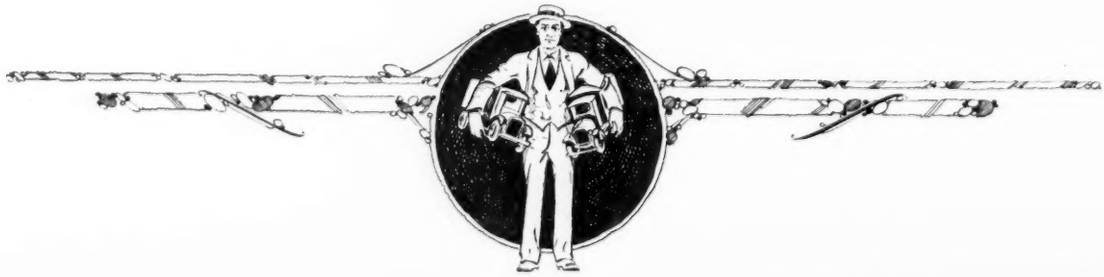
This picture of a typical, sound truck retailer is worth particular attention at a time when the efforts of many truck builders are centered upon increasing their dealer roll. Adequate representation often seems too difficult to get in certain areas that the task assumes Herculean proportions in the mind of the executive.

To say that procuring more good retailers is easy would, of course, be to dodge the obvious facts of the case. But to emphasize the presence in the field of a growing number of capable, stable truck merchants and to point to them as examples of what may be possible through continued effort in retail organization building, is necessary if the whole picture is to be viewed clearly.

Increase in Outlets

The distribution of motor trucks constantly is becoming more widespread. With this growth, the number of distribution outlets necessarily has to increase, just as they have in practically every other line of merchandise. Difficulties of distribution from central points without at least some sort of physical representation in local areas seems likely to become more difficult as time goes on.

All this points toward the probability of the need arising for more good motor truck dealers. The current existence of a goodly number of competent truck retailers is an encouraging sign. Good dealers by example and by setting the pace competitively with their intensive, constructive methods tend to make fertile the soil for growth of more useful dealers. A good many years of hard work still are ahead before the truck industry will have available enough capable retail merchants to fill its needs, but the groundwork for its constructive development already exists. The development work now being done by many truck factories seems certain to continue to bear fruit as the years go on.



New Oil Fired Furnace Produces Better Quality Gray Iron

German invention permits control of carbon element in iron. Similar results have been obtained but with much greater expense by use of electric furnaces.

CONSIDERABLE work has been done in Germany recently to improve the quality of cast iron, and *Der Motorwagen* in a recent issue reviews two articles dealing with the subject. Dr.-Eng. Th. Klingenberg in the *Zeitschrift des Vereines Deutscher Ingenieure* shows that range in the equilibrium diagram of iron-carbon alloys which is of particular interest in connection with the production of high-quality gray iron. The premises for such an iron are (1) perlitic structure, (2) suitable methods of segregating the graphite and (3) control of the total carbon content.

So far three methods are known by which these objects can be attained, namely, the Thyssen-Emmel process, the process of the Esslingen Machine Works, and the electric furnace process. All of these processes permit of control of the total carbon content, which is not possible with the ordinary cupola. No details have been published as yet regarding the Thyssen-Emmel process, which for this reason cannot be discussed. As regards the electric furnace process, it is very expensive for cast iron in Germany. On the other hand the Esslingen Machine Works have developed an oil flame oven invented by Wust which is said to give all around satisfactory results.

Process Described

At one side of the hearth is located the oil burner, the flames sweep across the bath, and pass up through the filling shaft located opposite the oil burner. They melt down the charge in the filling shaft and thereafter heat the blower air by the regenerative process. The filling shaft is charged in the normal way, except that no coke is put in. Coal tar oil with a heat value of 16,500 B.T.U.s per pound is used as fuel. The fuel consumption is said to be quite low. As regards the properties of the product, it is stated that it is possible to obtain a reproduceable tensile strength of 23,500 lb. p. sq. in. and a reproduceable transverse strength of 38,000 lb. p. sq. in.

Chr. Gilles writes in the *Giesserei Zeitung* that efforts to improve the mechanical properties of cast iron have met with success only in recent years, chiefly because scientific research has devoted itself to this branch of industry, which is of such great economic importance. Some years ago Rudeloff made systematic investigations at foundries, on the order of the professional associations. He determined the mechanical properties attained in different foundries with the same charge composition. The values of the transverse strength varied between 23,000 and 30,500 lb. p. sq. in., the values for the tensile strength between 11,650 and 16,500 lb. p. sq. in. He also investigated the "marksmanship" of the different foundries in respect to definite mechanical properties, and the results obtained in this connection were no better.

High mechanical properties obtained accidentally seemed to make it possible to obtain these values regularly by properly conducting the working processes. There is no dearth of processes which are intended to achieve this improvement in the qualities of the iron. These may be roughly divided into two classes: (1) Methods which have reference particularly to the improvement of the furnaces and (2) methods which are intended to improve the properties by changing the charge and by properly handling it in pouring.

Classification of Methods

To the former belong oil-fired cupolas, but these have not yet come into extensive practical use. The class also includes the coal and gas-flame-fired furnaces. These produce a very good quality of iron but are seldom used on account of the high fuel consumption. Recently a very promising furnace, the oil-flame furnace of the Esslingen Machine Works (Wust System), has been made available. Excellent results have been obtained with this.

The author proved by his own experiments that the fuel consumption is such that the heat in the molten iron represents substantially 11 per cent of the total heat energy expended. The temperature of the molten iron is between 2700 and 2900 deg. F. With a transverse strength of 38,700 and a tensile strength of 23,600 lb. p. sq. in. the composition of the iron was as follows: Carbon 2.7 per cent; silicon, 1.66 per cent; Manganese, 0.9 per cent; phosphorus, 0.42 per cent, and sulphur, 0.077 per cent.

To this group belong also the electric furnaces, used either directly or according to the duplex method. With these the furnace is charged with iron which has been melted in a cupola. Although these electric furnaces work efficiently at the present time, they are not widely used because of the high cost of current.

Recent Developments

Efforts to influence the properties by the second method have been made also. By a suitable proportioning of the charge in accordance with the thickness of the casting walls, an improvement can be made, as has been shown by Meurer. In recent years it has been shown by Diefentaler and Sipp (Lanz patents on pearlite cast iron) that a cast iron consisting principally of laminated pearlite and no ferrite possesses excellent mechanical properties. By a suitable selection of the elements of the charge and corresponding cooling, excellent castings were obtained. Finally, mention should be made of the Thyssen-Emmel process, of which, however, nothing definite is known yet.

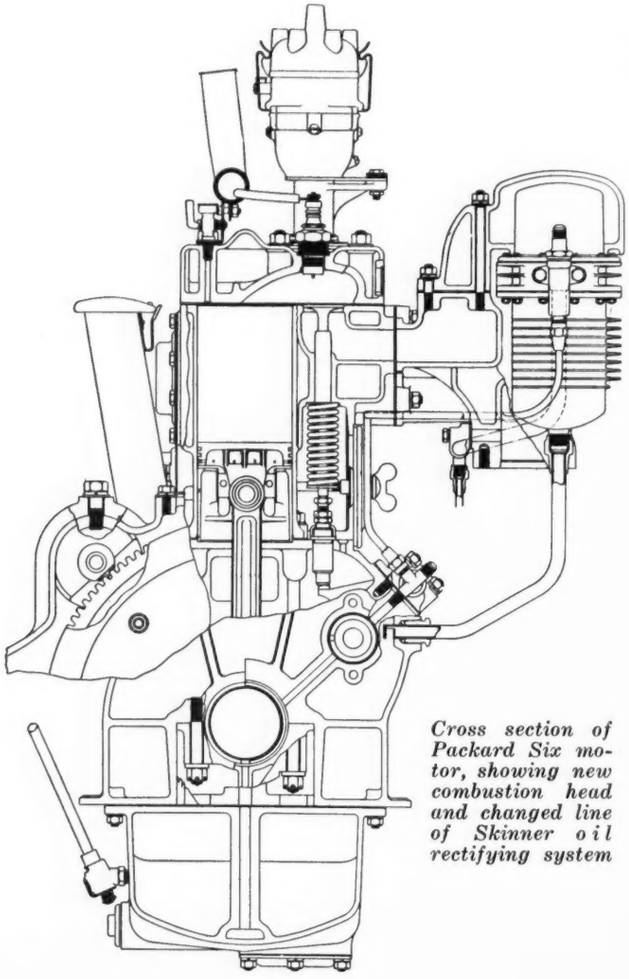
Front view of latest Packard. Inside contour of radiator shell has been smoothed and full crown fenders are fitted

New Packard Line Employs Hypoid Gears in Rear Axle

Aluminum pistons with Invar struts, redesigned combustion chambers, new clutch, novel spring construction and body changes made on both chassis.

By Leslie S. Gillette

THE introduction of hypoid final drive gears to make for quieter operation, longer life and increased load-carrying capacity is the outstanding feature of several important mechanical changes in the improved line of Packard six and eight-cylinder cars. The power output of both engines has been increased by the adoption of Nelson aluminum pistons having the Invar strut, redesigned combustion chamber, and new manifolding. Crankshafts have been made heavier, the bore of the "eight" has been increased by ⅛ in., and new two-plate clutches are employed on both chassis.

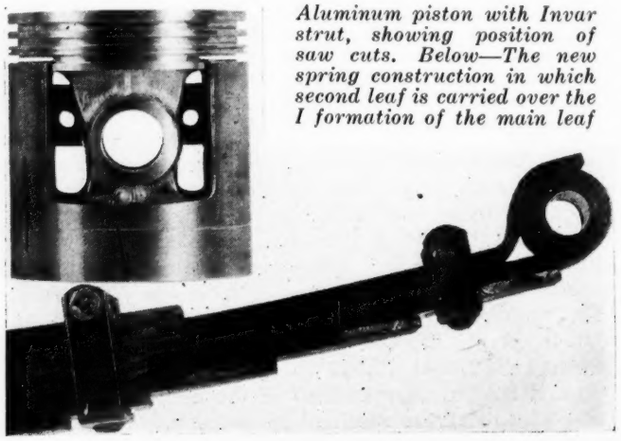


Cross section of Packard Six motor, showing new combustion head and changed line of Skinner oil rectifying system

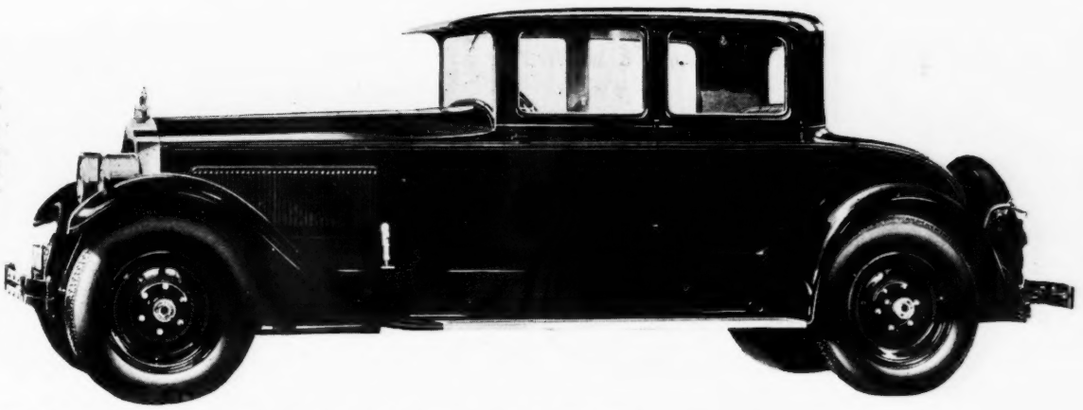
Coincident with the chassis changes, all closed bodies have been altered in design, chiefly by lowering the roof line, adopting the double-belt moulding effect and continuing the roof over the windshield to form a permanent visor. The radiator design has been changed by smoothing out the inside contour of the shell although the characteristic exterior curves are retained. Full crowned one-piece fenders are now standard equipment on the "eight" chassis. The line of bodies on both chassis is the same as before with all prices remaining unaltered except on four models, which are revised as follows: Four-passenger coupe on both "six" and "eight" chassis increased $100 to $2685 and $4750 respectively; four-passenger roadster on both chassis decreased by $100 making them now $2685 on the smaller chassis and $3850 on the eight. Only minor changes have been made on the open models.

Extensive Changes in Plant

With the introduction of the new line extensive changes have been made in the plant of the Packard Motor Co., several million dollars having been spent in the last few months in remodeling and re-equipping the shops. The method of car assembly has been affected with this change. A continuous assembly, starting with the chassis frame and finishing with the complete car ready for the road, replaces the former method of assembling the chassis, road testing it and then mounting the body. A road test of several miles is given after the completed car leaves the assembly line and the car is then returned to the factory for a rigid inspection. One of the items of new equipment is the battery of gear



Aluminum piston with Invar strut, showing position of saw cuts. Below—The new spring construction in which second leaf is carried over the I formation of the main leaf



Packard eight-cylinder, four-passenger coupe. Note double belt effect, low curved roof line and integral sun visor

cutting and lapping machines used in the production of the hypoid gears which have been supplied by the Gleason Works.

Hypoid gears (see June 10 issue, *Automotive Industries*) resemble bevel gears, but the axis of the pinion is offset from the axis of the gear and does not intersect it. The tooth action of the gears combine the rolling action of spiral bevel gears with the sliding action of worm gears, thereby introducing a sliding element along the entire face of each tooth. Another way of expressing the hypoid gear action is by comparing the action of a sled runner passing over a rough surface where the runner tends to ride over the surface smoothly. The sliding action of the hypoid gears has the same effect in smoothing out the tooth engagements and hence they tend to run more smoothly than spiral gears.

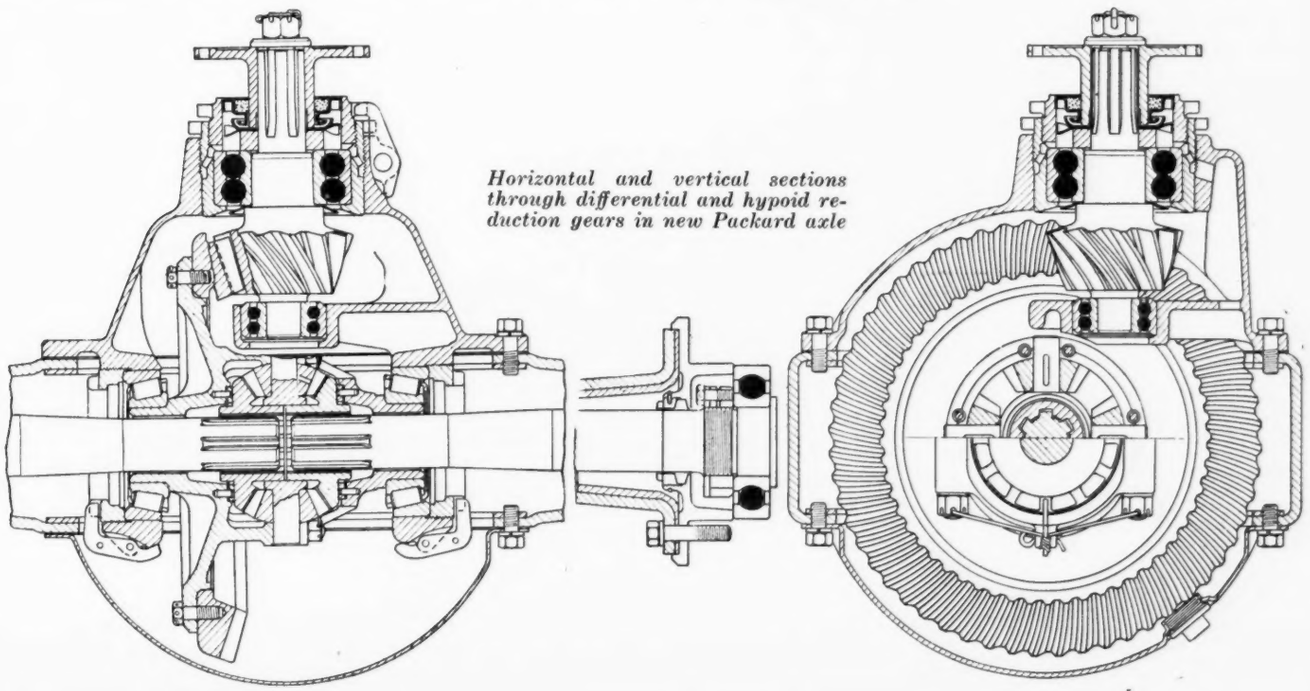
On the new Packard cars, the axis of the pinion is offset 2 in. below the axis of the gears and the effect of this arrangement can be seen in the accompanying views. It will be noted that the drive for the rear axle is not through the center of the differential housing carrier as is customary, but is set considerably below. The pinion is formed integral with the shaft and is supported fore and aft on two double row ball bearings. The ring gear is attached to the differential carrier flange by series of cap screws thus insuring the perfect alignment which is essential in the operation of hypoid gears. Two taper roller bearings are employed to carry the differential group in the customary manner.

With this type of axle design the end thrust on the front bearing is reduced considerably and longer life for all axle parts is claimed because of the smoother operation. As in the previous Packard spiral bevel axles, the straddle type of mounting is employed and outside of the differential carrier, gears, and bearings, the axle is the same as before. The pressure angle of the hypoid gears is 17½ deg. with the spiral angle 35 per cent. Adjustment and maintenance of hypoid gears is very similar to that of spiral bevel gears, the amount of back lash being approximately the same. Packard is the first automobile company to put the hypoid gears into regular production.

With better motor performance it has been possible to use lower gear ratios in the rear axle. Three ratios are provided for on each chassis as follows:

	Low	Standard	High
"Six"	5 to 1	4 2/3 to 1	4 1/3 to 1
"Eight"	4 2/3 to 1	4 1/3 to 1	4 to 1

On the previous models the standard ratios on the "six" and "eight" cars were 5⅛ to 1 and 4 2/3 to 1 respectively. Due to the increased torque of the new engine the cars show much better ability at low speeds and easier handling in traffic.



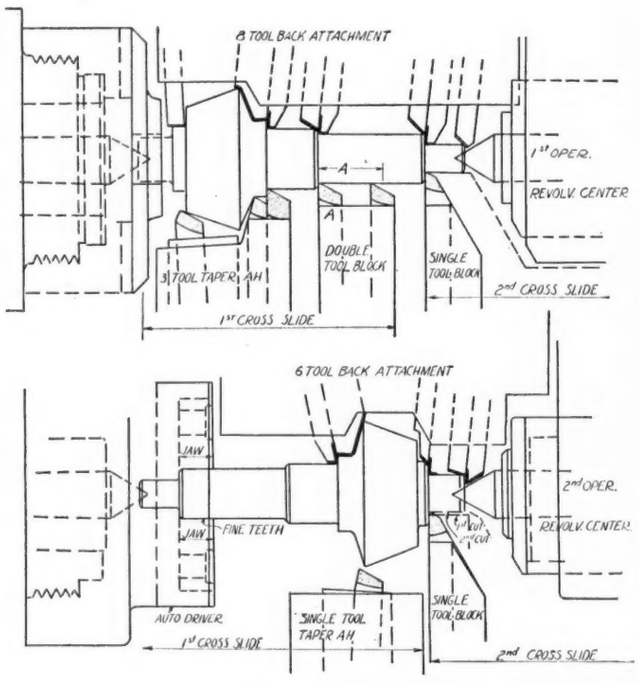
Horizontal and vertical sections through differential and hypoid reduction gears in new Packard axle

Through several changes in both "six" and "eight" engines, the power output has been increased materially. On the smaller engine, the hp. has been boosted from approximately 60 to 81 hp. at 3200 r.p.m. without change in piston displacement while the larger engine now rates at 109 hp. at 3200 r.p.m. as compared with the previous 80 hp. The bore of the larger engine, however, has been increased by ⅛ in. to 3½ in. (same now as the six) to increase the low speed torque and facilitate production.

Speed Over 86 M. P. H.

With the object of testing the speed of the improved "eight" the writer was permitted to drive one of the seven-passenger sedans. Due to the nature of the roads near the city it was impossible to reach top speed but a rate of 86 m.p.h. was attained without any feeling of unsteadiness. The acceleration from 50 m.p.h. seemed to be as quick as accelerating from 20 m.p.h. A speed of 58 m.p.h. was attained in second gear without any undue noise arising from the transmission while the car kept in a straight line when the brakes were applied hard at 75 m.p.h. showing perfect equalization of the new internal shoe four-wheel brakes.

In lightening the weight of the reciprocating parts, aluminum alloy pistons are employed in place of cast iron. Made specially to the specifications of the Packard Co. by the Bohn Aluminum & Brass Corp., the new light alloy pistons employ two Invar steel struts located inside the piston skirt to control thermal expansion. The "cut-loose" for the piston head is provided for by saw cuts in the lowest or third piston ring groove on the bearing side. In this groove is fitted a perfect circle oil control ring and the saw cuts in the groove act as oil relief holes. On each of the bearing sides of the piston two vertical relief saw cuts are made while the skirt is slotted on either side below the pin center. With the honed cylinder bores and the special piston design, the pistons are fitted to .002 in. clearance. Five operations are now performed on the cylinder bores. These are: 1, rough bore; 2, semi-finish bore; 3, ream; 4, grind; 5, hone. Multiple spindle grinding and honing machines are used in finishing each block.



Packard rear axle gear cutter

With the change in the piston design and the elimination of the extended lip on the piston skirt, the Skinner oil rectifying system now draws the oil through a by-pass valve in the oil gage line instead of from the pistons as in the earlier series. A T-joint connected with the rear camshaft bearing permits the oil pressure to go to the oil gage and to a balanced metering valve on the side of the rectifier, the latter having direct connection with the vacuum side of the rectifier. Other changes along this line embrace a combination oil filler and breather, preventing the throwing of oil at high speeds, and the flanging of the valve cover plate to allow a cork gasket to be used in preventing the escape of oil by the cover plate.

A new design of combustion chamber termed by the Packard Co. as the "Turbo head" has allowed a higher compression and better turbulence with resulting increase in b. hp. The flat surface of the combustion head sets almost flush with the top of the block and extends approximately half way across the bore. The spark plug is located directly in the center of the domed portion and also comes in line with the centers of the valves with the points of the plug projecting well below the domed portion. The cylinder heads are machined all over and the combustion chamber is polished.

New carburetors are provided to meet the increased power of the engines and both the intake and exhaust manifolding have undergone changes. Larger passages in the intake manifold have added to the accelerative ability and the exhaust manifold is so constructed that the exhaust gases from the two middle cylinders pass through a chamber surrounding the intake manifold elbow and form a hot spot for heating the incoming mixture.

The firing order on the eight has been altered from 1-3-2-5-8-6-7-4 to 1-6-2-5-8-3-7-4 thus giving a complete change of direction flow, resulting in reduced exhaust noise. Also, the depression in the manifold has been equalized by employing a tube that connects the front and rear intake galleries in the cylinder block. Other changes include increasing the diameter of the fan pulley and reducing by two the number of coils in the valve springs. The appearance of the eight engine has been improved considerably by the use of nickel-plated acorn type cylinder head nuts; sand blasted aluminum parts; cylinder block, rods and piping enameled; large nickel-plated nuts on spark plugs and nickeled priming cups. Mufflers on both models have been increased in size to take care of the higher engine power.

Crankshafts Heavier

Crankshafts on both engines have been made heavier although their design is unchanged. The diameter of the main bearings has been increased by ¼ in., the crank-pin diameter is 1/16 in. greater and the width of the cheeks has been increased by ⅛ in. The new shafts on six and eight now weigh 82¾ lb. and 97½ lb. respectively. Newly developed machines are used to give a hone finish to the crankshafts. The Delco ignition distributor on both engines is of the single coil, jump-spark type employing a four-lobed cam to insure positive firing in all cylinders at high speed. In the fuel system a gasoline filter is placed in the line between the vacuum tank and carburetor.

Two plate clutches with four friction surfaces are employed on both the six and eight-cylinder chassis to replace the former multiple disk clutches which have been used for several years. Moulded asbestos composition is riveted on either side of the two disks while the driving plate is unusually heavy and formed of cast iron. Due to the fewer rotating parts, it has been pos-

sible to obtain better balancing of the clutch parts and the new design permits of smoother engagement and easier shifting. The clutch shifter thrust bearing has also been made heavier. Only minor changes have been made in the transmissions and a backing light switch has been added to the gear shifter rail cover.

The first announcement is made at this time of the adoption of Packard-Bendix, three shoe, internal four-wheel brakes although the Packard cars appeared at the New York and Chicago national automobile shows so equipped. The general layout of the brake operating mechanism does not differ radically from the earlier method when a combination of exterior and interior brakes was used.

A safety feature is incorporated in the front chassis springs on both cars. An auxiliary main leaf sets above the main leaf proper. The end of the auxiliary main leaf is curved upwards and into a hook over the eye formed in the true main leaf. In the event of failure of the front main leaf the weight is taken on the hook of the auxiliary leaf thereby retaining the front axle in place. On the Packard eight the rate of action of the front springs has been increased and three extra leaves have been added to prevent striking through and to provide an additional factor of safety. Changes have been made in the steering gear, one being a new method of locking the upper steering worm bushing in place.

On the tubular frame cross members the stock gage of the flanges has been increased from ¼ in. to 5/16 in. In addition the six-cylinder frame has been altered to accommodate Watson Stabilators which are now standard equipment on this model. Stabilators are continued on the eight chassis. A change has been made also in the spare wheel carrier to reduce the physical effort necessary to dismount and remount the spare wheel. Along with the full crowned one-piece fenders which are used on the eight chassis only, the running boards have been widened to give greater protection from wheel splashes.

Body Alterations

Many alterations have been made in the interiors of the closed bodies. The front seat riser in the five-passenger sedan has been removed, thus lowering the seat and increasing headroom, while all folding seats in other models have been redesigned to provide increased comfort. Doors are trimmed without pockets, small compartments being provided behind the front seat on the sedans. Rapid action window regulators make for easier operation of the windows while a concealed method of attaching the door sill plates is adopted. In place of foot rails, hassocks upholstered to match the interior are used on the sedans. On the eight bodies, all exposed interior hardware is finished in Old English Bronze and all cowl and window mouldings are of walnut. Vanity and smoking cases finished in tooled leather resembling walnut are fitted in all sedans while a special clock is offered on the eight cars. Otherwise the equipment is the same as before.

First Heat Treatment of Aluminum Alloy an Accident

ONE of that class of fortuitous accidents which solve apparently insurmountable problems in both production and engineering fields, is described in a recent letter by Chas. B. Bohn, president of the Bohn Aluminum and Brass Corp. Mr. Bohn's anecdote, which is particularly apropos at this time due to the increasing trend toward the adoption of heat treated aluminum alloy pistons, brake shoes and other parts, runs as follows:

"There have been some very wonderful and interesting developments in the heat treating of aluminum alloys in the last twenty years. These developments have made it possible, by proper heat treating and proper alloying of the metals, to more than double the tensile strength and elongation, and make it possible for aluminum alloys to be used successfully in the place of malleable iron, drop forgings and steel, as they get all the necessary strength required with the extreme lightness and non-corrosive qualities of the metal.

Leaky Manifolds

"I heat treated the first aluminum alloy more by accident than anything else. Along in 1906 I believe, or 1907, the Allyne Brass Foundry of Michigan, of which I was vice-president and general manager, was making an intake manifold for the original "T" model Ford. This manifold weighed between one and one and one-quarter pounds and at first seemed to give excellent results. Later on reports came back from the Ford distributors they were having trouble with the gasoline leaking through the casting. Ford then tested out all the castings on hand with a 50 pound water test. Practically every one leaked. They immediately returned them to the foundry and upon testing the castings we were making, we found practically all we had on hand leaked.

"Of course this was an entirely new problem as at that time we had never tested the castings for leaks and it meant a serious loss to have these castings come back.

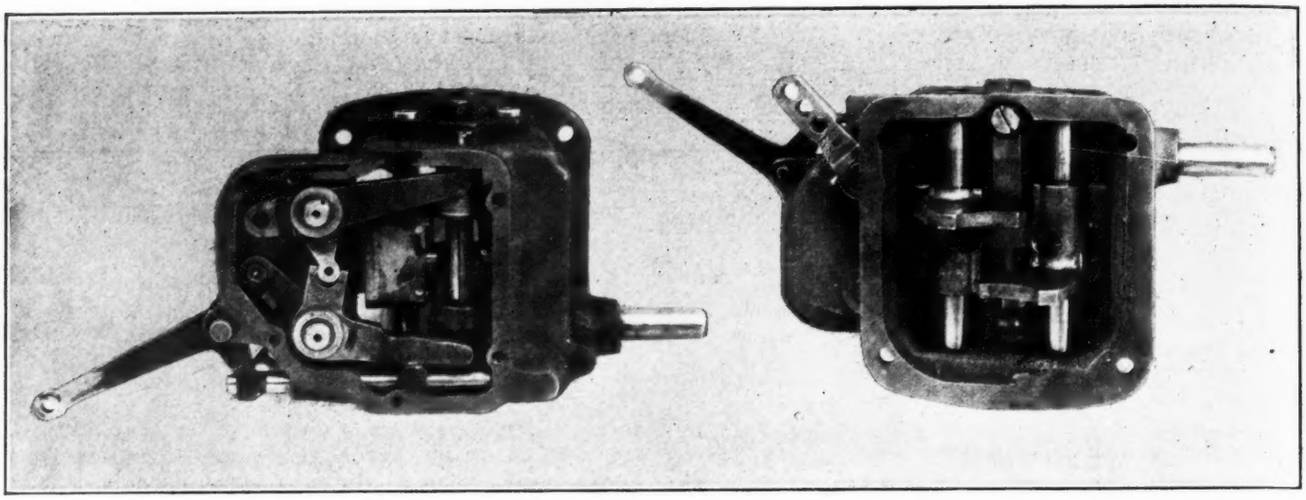
"We piled all the castings back of our brass furnaces until we could find some better method of making them or find some way to overcome the leaks. About a week later we rigged up a testing apparatus and started to test the castings which were returned, and under 50 to 75 pounds water pressure we were astonished to find they didn't leak.

"After an investigation we found we were heat treating the castings. The brass furnaces were started every morning at about four o'clock and were allowed to die down after four in the afternoon. The heat behind the furnaces would run up to about 1100 to 1200 deg. Fahr. and gave us a perfect heat treating action.

"From that time on we started to experiment and practically all pressure castings were made with heat treating. I believe this was the origination of the heat treating of aluminum alloys in this country.

"Of course, during war time it was absolutely necessary to make strong and better aluminum alloys for aircraft construction, and the development of heat treating moved very rapidly, with the result that today we can get a tensile strength of 28,000 pounds, with a minimum elongation of 4½ per cent by heat treating aluminum sand castings, and a tensile strength of 35,000 pounds with a minimum elongation of 6 per cent by heat treating permanent mold castings. In heat treated aluminum pistons we guarantee a Brinnell hardness of 130 to 150. On aluminum drop forgings properly heat treated we can get a tensile strength of about 60,000 pounds.

"This development I believe is progressing much faster than the average manufacturer realizes and as the airplane business develops, together with the possibilities of the use of heat treated alloys where extreme strength and lightness are required, we think the use of heat treated aluminum alloys will increase by leaps and bounds."



Pressed steel cover removed to show internal parts at the completion of the shifting cycle

View from below showing gearcase mounting flange, shifter forks and interlocking plate

Unrestricted Pre-Selection Feature of New Mechanical Gear Shift

Gears unmeshed and meshed positively during downward motion of clutch pedal. Springs are not relied upon for shifting.

PRE-SELECTION of the desired gear is possible at any position of the clutch pedal lever which actuates the Randol mechanical gear shift. In addition to this feature, this mechanical gear shift is unique in that all gear shifting and returning of the gears is performed positively on the down stroke of the clutch pedal, no dependence being placed on retraction springs, or the clutch spring. At each full stroke of the clutch pedal, the gear already in mesh is returned to the neutral position, and either this gear or any other pre-selected gear is shifted to the engaged position, no portion of the shifting operation being performed on the up stroke of the clutch pedal.

Gears are selected by a small lever on the top of the steering column. This lever is indexed at the different positions by a spring operated pawl which engages with a notched sector. The sector is fixed against rotation with the steering wheel, and is so designed that it cannot be shifted into reverse position from any of the others by mistake. The reverse notch is located at the lowest position on the sector, and neutral, low, intermediate and high follow in order toward the top.

Inclosed in a Casting

As illustrated by the line drawing Fig. 1, the shift-device proper is inclosed in a casting which takes the place of the ordinary gear case cover. One external lever A which operates the indexing or selecting rack, is connected to the manual selector assembly at the lower end of the steering column. Another lever B, which operates the actual shifting mechanism, is connected to the clutch pedal lever. Within the enclosure are two fixed rods upon which the shifting forks slide, and an indexing shaft which carries two sliding shifted collars, the latter being operated by the shifting levers.

The shifting levers are actuated from the lever on the outside by an ingenious system of linkage which converts motion on the outer lever in one direction into oscillation of the internal levers.

Referring to the line drawing, the external lever A operates a transverse rack bar, the teeth at the inner end of which engage with a small gear fixed on the rear end of the selector shaft. On this shaft are two sliding collars, E which rotate with the shaft, being feather-keyed. In the normal position, when the clutch pedal is out and the gears are in neutral position, or if any gear is engaged, one of these collars is located near each end of the selector shaft.

When the clutch pedal is depressed so that the clutch is already disengaged and the work of gear shifting is started, these collars move to the center simultaneously, being actuated by the internal shifting mechanism which will be described later. As the end of pedal travel is approached, both collars move outward simultaneously to the extreme position. The collar at the left or front engages all gears which move forward into mesh, which are the low and high, while the collar at the right or rear engages the two gears which move to the rear into mesh, which are the intermediate and reverse.

As the collars move inward, the inner end of either one picks up a fixed pin in the shifter fork of the gear already meshed and moves that gear to the neutral position. In the plan view the shifter forks are designated by F and fixed pins may be seen between the ends of the two collars E. Each of the shifter forks also carries two spring actuated plungers G, which are picked up selectively to shift the proper gear into mesh.

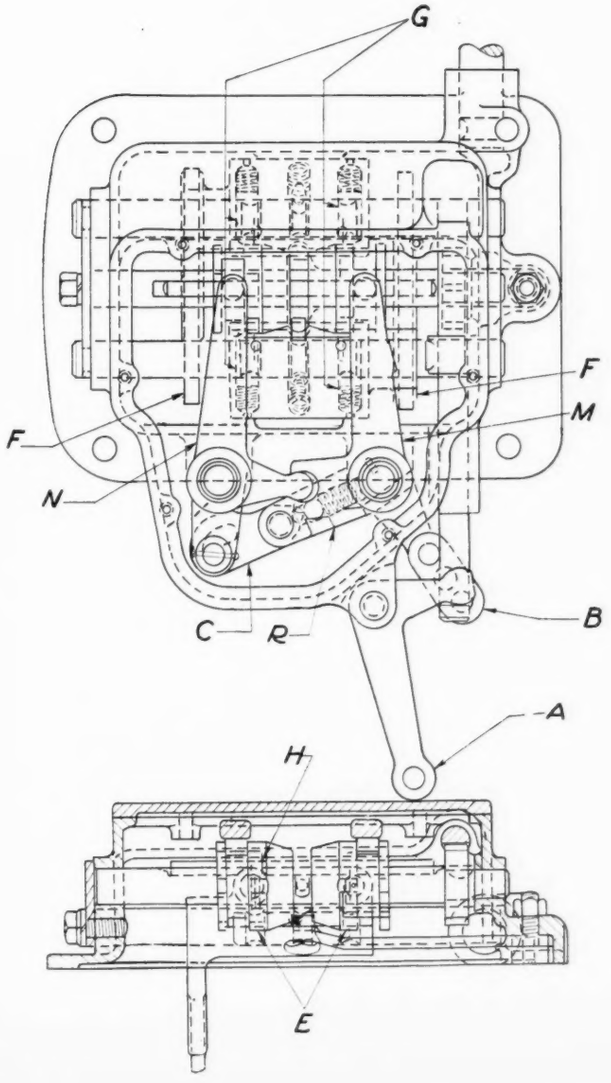
It will be noted that the inner ends of the collars are tapered. Also, each of the collars has two notches milled

in its largest diameter, one being shown at H in the longitudinal cross section. These notches are spaced with respect to each other around the two collars so that rotation of the selector shaft to any position determined by the manual control will bring the desired notch into line with the correct spring plunger, four of the latter being indicated at G.

Staggering the notches in the two collars makes it impossible to bring any two of the notches in line for engagement with two of the spring plungers at the same time.

All the gears of the transmission are held in the correct neutral, or engaged positions, by spring actuated balls which engage with turned grooves in the fixed gate rods. Then, as the collars move inwardly, all of the spring-actuated plungers ride up on the tapers until the correct plunger drops into the notch which has been properly indexed by the selector mechanism. As the direction of the motion of the collars reverses and they move outward, the shifter fork is pulled along and carries the corresponding gear into mesh. As long as the position of the selector is not changed this gear will move into neutral and back again to the engaged position each time the clutch pedal is fully depressed.

If another gear is pre-selected, rotation of the collar causes the plunger to bear on the plain portion of the barrel of the collar and the gear is held in position by the spring-actuated ball in the groove on the gate rod.



Full depression of the clutch pedal, with the consequent motion of the collars toward the center, carries the gear already in mesh back to neutral, through the medium of the fixed pin. At the center, another spring plunger is picked up and the corresponding gear is drawn into mesh.

It is impossible for an inactive plunger to be picked up by the collar notches until the shifter-fork carrying the active plunger has been returned to the neutral position. As a further precautionary measure, a positive interlocking mechanism is provided between the shift forks, which makes it impossible to carry one shifter-fork out of the neutral position until the active fork has been brought back into this position. The T-shaped piece anchored at the rear of the case and interposed between the shifter forks, functions to accomplish this result.

Alternately, if the manual selector on the steering wheel column is placed in the neutral position, none of the notches on the shifter collars lines up with the spring plungers and therefore all gears remain in the neutral position.

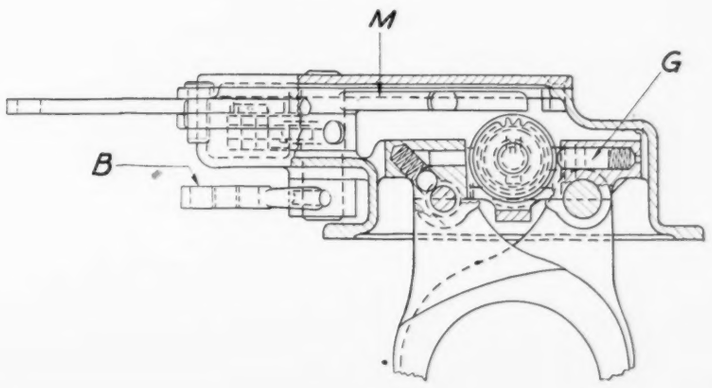
A Study in Kinematics

An interesting study in kinematics is provided by the shifter link and lever system which converts a single stroke of the external lever into motion in both directions and finally allows the external lever to return to its original position idle. The external lever B and the internal lever R are keyed to a short common shaft; at the top end of this shaft is the lever M which is shown in the neutral position and just about to move the collars into the outer position. At the beginning of the action, lever R forces the end of lever N, which is engaged with a shifter collar, toward the neutral position by means of the interposed link C. This link has a peculiar L-shaped slot in its end into which engages a pin in lever N. In one portion of this slot engages the pin in lever N, until the center lines of lever R and link C are in line, which portion of the action brings the shifting collars into the neutral position.

At this point, the link is tripped and the remaining or longer portion of the L-shaped slot serves as clearance during the remainder of the action. Up to this point lever N has actuated lever M through the tongue and groove arrangement shown. Just after the link O trips, a dog on lever R engages with the back of the extension which carries the groove on lever M and reverses the action, causing the collars to be moved to the outer position until the longer portion of lever M strikes a fixed stop. On the back stroke of levers B and R no motion is transmitted to the two shifting levers.

At the conclusion of the back stroke, the link C is again tripped into its effective position as shown in Fig. 2 by

Fig. 1. Assembly drawings of Randol Mechanical Gear Shift



means of a spring-actuated ball which is enclosed in the internal lever R, and bears on a cam-shaped surface on the end of the link C. In some instances a special external lever B is supplied, so that the slip link and outside spring for returning the toggle mechanism to the effective position are eliminated. With this special lever the back stroke of the clutch pedal is utilized to return the linkage.

Control on Steering Column

One of the principal features of this device is absolute freedom of speed selection through the manual control on the steering column, regardless of the position of the clutch pedal or shifting mechanism. It is thus unnecessary to store up energy in devices outside the actual shifting mechanism, as the shifting can be done directly. This is due to the flexibility of the selective plunger connections between the shifting collars and the shifter forks. The arrangements provides a positive shifting mechanism, and changes of gear can be made up to the point when the shifting collars begin to move outwardly. However, selection can be made at any time, as the shifting collars are always free to be moved by the manual control. If a selection is made after the collars have begun to move outwardly, the notch fails to pick up its corresponding plunger.

In driving a car equipped with this device, only a slight sound can be heard when shifting. It is possible to coast in the usual manner, by depressing the clutch pedal to the point where the clutch is disengaged, without disturbing the gear shifting mechanism, which is not brought into operation until the clutch pedal has completed substantially one half of its stroke. Only slight effort is required to operate the manual control, and the pre-selective feature makes it possible to drop back into second at any time and thus use the engine as an effective brake. It is claimed that the mechanical gearshift is more rapid in action than hand-operation, hence acceleration can be increased. As soon as the shift for one speed is made, the selector can be set for the next higher speed, and it is then only necessary to depress the clutch pedal to engage the next gear. These features are particularly apparent when driving in dense traffic.

Europeans Make Air Traffic Regulation Agreement

AN agreement concerning tariff formalities in connection with air traffic has been concluded between France, Belgium and Great Britain, and the terms of which were published in the French *Journal Officiel* of June 27 last.

All aircraft engaged in international traffic between the countries mentioned must carry a passenger list and a manifest of the merchandise and provisions carried on board. Detail declarations must be made out by the shipping firms.

Pilots of airplanes engaged in passenger-carrying services must deliver to the customs authorities at the starting field a list of passengers embarking for a foreign country.

International transportation of merchandise by airplane will be subject to the issuance by the transport concern of a manifest which, as far as possible, should consist of a single document, covering the whole cargo. This manifest should be made out in triplicate and should conform to Model No. 1 joined to Appendix No. 2 of the International Convention on Aerial Navigation of October 13, 1919, and must mention the following double undertaking, duly signed by the commander of the vessel:

To declare, under penalty of the law, the merchandise at the bureau of destination within a fixed period, and

To deliver to the bureau at the starting point, also within a fixed period, a copy of the manifest duly endorsed by the bureau at the port of destination.

Enumeration of Parcels

It will enumerate the parcels of merchandise properly so-called and parcels of provisions for consumption on board. The parts within the space reserved for merchandise which are not utilized must be "barred" by cross lines in black ink.

After verification of the statements which it contains and approval, if needed, of erasures and alterations, the number of parcels is added, completely spelled out, the copies of the manifest are dated and certified to by the customs office of the point of departure, and the seal is re-attached. Two copies of the manifest are given to the pilot, to be delivered by him to the customs officials at the point of destination. The third is dispatched by mail, addressed to the chief customs officer of the landing field for which the machine is destined.

Search at Departure

Before the departure of the plane the customs officials make sure, by a searching examination, that the machine does not contain any parcels of merchandise other than those listed on the manifest. Moreover, in the case of Franco-Belgian traffic only, the customs officials will proceed to a summary search of all passengers and the pilot and of their hand baggage, and will prevent the embarkation of any article the importation of which is prohibited in the country of destination or in a country flown over, found on any passenger or in his hand baggage. If, however, these articles are to be re-shipped upon arrival under the transit regime, they are withdrawn from the hand baggage and placed with the merchandise. In that case they must be enumerated in the manifest.

The contracting countries will exchange between them lists of articles the importation of which into the respective countries is prohibited. These lists will be displayed at the starting fields and the posters will contain a notice informing passengers and pilots of the fines to which they make themselves liable by importing the prohibited articles into the countries for which the machine is destined.

To facilitate identification of the parcels of merchandise at the starting field, at the landing field, and, if necessary, in course of transit, the shippers are required to affix to the parcels, in legible characters, the address, marks or numbers by which they are referred to in the manifest. If the plane comprises a special compartment for the transportation of merchandise the transport company, on its part, must stow the parcels carefully in this compartment, as far as possible in the order of listing in the manifest, in such a way that the marks are plainly visible. When there are no special compartments or receptacles, the parcels will be enclosed in sacks or containers furnished by the customs service.

Novel Method Used for Making Radiator Brace Rods at Oakland Plant

Unusual combination of electric welder and small press utilized. Forge plant job is performed in machine shop.

AN unusual combination of electric welder and small press is utilized in the manufacture of Oakland and Pontiac radiator brace rods. In both of these cars, the radiator brace is the triangular type with a single point of application at the back of the radiator shell and two points of support somewhat apart at the dash. One long rod is formed into the triangular brace being threaded at both ends, so that nuts are screwed on both sides of the metal dash. The support at the radiator end is a flat surface drilled to allow the use of a bolt and nut between a bracket on the shell and the brace.

Both Ends Threaded

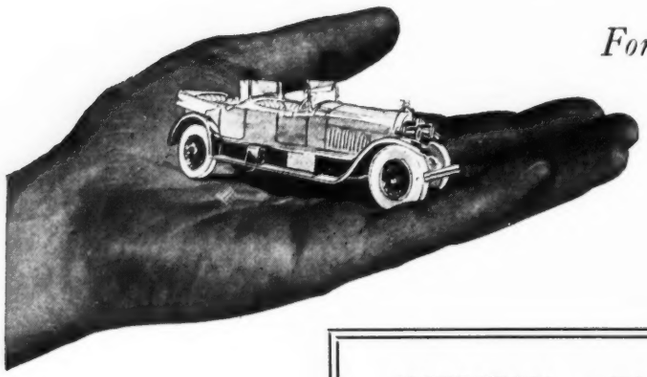
In manufacture, these rods are first cut to length and then both ends are threaded in a small Landis threading machine. From this machine they are passed over to a National welding machine which is fitted with a stop at one end, so that the section which is to be formed into the flat is located between the electrodes. After gripping the rods and applying the current in the usual manner the red-hot mid-section is given a slight kink by advancing one head as in welding operations. The operator then transforms the rod to a Toledo No. 41 press, which is directly back of him as he faces the welding machine.

As shown in Fig. 1, this press has no bed, but that unit is replaced by a heavy bar which extends from the column. The upper surface of this bar which is in line with the ram is formed into a die which produces the rear face of the flat at midsection of the rod. The ram carries the mating die. Like the welding machine setup, the press also is equipped with a stop which brings the heated section of the rod between the dies. The die in the ram is shaped to produce the flat and also bend the ends of the rod over into the finished shape. As the operator depresses the treadle, the ram comes down, the ends of the rod are swung downward and the flat is formed. From this operation, the brace rods are transferred to a small drill press, where the hole in the flat is drilled.

In this arrangement, a job which ordinarily is assigned to the forge shop is performed in the machine shop line. Considerable trucking and handling are eliminated, as one operator runs both the welder and the press. He is able to produce the entire daily requirement of brace rods for both lines of cars.

Fig. 1. One man operates the National electric welder at the right and the small Toledo press at the left to form radiator brace rods for Pontiac and Oakland cars

What is a European Light Car?



Foreign products differ from American practice in many ways, study of design and average dimensions show

By P. M. Heldt

AMERICAN conditions of sale and operation demand cars of different design than that of the average European light car. Many foreign light car ideas are being adapted here, but our home product seems likely to remain essentially American in character.

We are hearing much discussion of European light cars today, however, and for that reason it is interesting to try to define more clearly just what constitutes this type of car. Mr. Heldt's analysis of 76 British models sheds some new light on this question.

NOW that the term "European type" is coming into use here in connection with light and low-powered cars, it may be of interest to investigate just what are the features of the light cars produced in Europe and in what respects they differ from our own light and low-priced cars. It must be recognized that commercial conditions in the American market have somewhat retarded development of the smaller type of car here. Competition has been very keen and generally on a price basis. It has been the impression that technical improvement had less appeal to buyers of this type of car than to those who purchase cars in the medium price class, besides which the need for steady, low cost production discouraged changes in design except those affecting general appearance.

This seems to be the explanation of the fact that most of our four-cylinder passenger car engines operate at comparatively low piston speeds, much lower than the speeds of corresponding European four-cylinder engines, though our six-cylinder engines now run as fast as those of European manufacture, if not faster on the average. The speeds here referred to are those at which the engines develop their maximum power and not those at which they actually run in cars on the road.

There are two outstanding differences between modern European light cars and American cars of the lighter, four-cylinder class. In the first place, the former are equipped with engines of much smaller displacement and running on the average at much higher piston speed, their higher speed making up in part for their deficiency in respect to displacement. Secondly, practically all of the European light cars have a narrow tread, that is to say, a tread of less than standard 56½ in. width.

One of the most consistent developments in automobile engine design has been along the line of increased piston speed. The term "high speed engine" is a relative one and means something different almost every year. In his book on Motor Vehicles and Motors published in 1900, W. Worby Beaumont says: "Gottlieb Daimler, who had for some years been occupied on gas engine construction, turned his attention to the production of small, light petrol motors, made highly powerful by their capability of running continuously at very high speeds of rotation." Daimler's early engines had a stroke of about 6 in. and ran at 600 r.p.m., making their piston speed 600 ft. p.m.

In 1914 a graph was published in one of the French automobile papers showing the gradual increase in piston speeds, and this is reproduced herewith. From this it appears that from 1908 to 1912 there was very little increase in the piston speed of stock car engines, while that of racing car engines increased nearly 50 per cent; but about 1912 designers of stock car engines began to take advantage of the increased speeds which racing practice had shown to be practical.

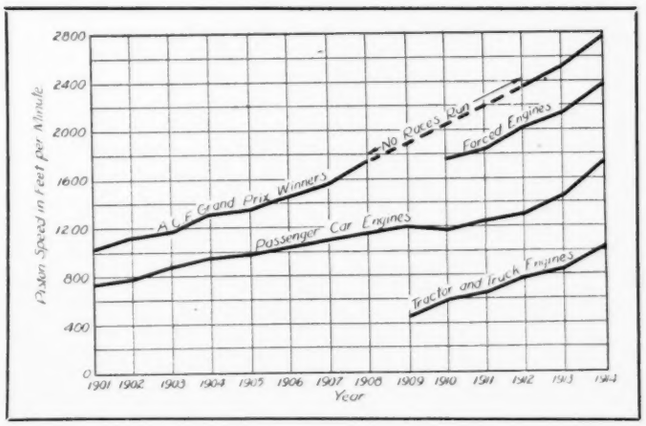
American practice in respect to piston speeds at that time lagged somewhat behind, but not very much, because data collected during the summer of 1915 showed that the average piston speed corresponding to maximum horse power was about 1600 ft. p. m., which figure seems to have been reached by French engines two years earlier.

Taking a dozen six-cylinder American engines of 1926 model, all of large production, the average piston speed figures out to 2200 ft. p. m. On the other hand, taking six American four-cylinder passenger car engines of 1926, all of them of large or fairly large production, the

average piston speed figures out to only 1350 ft. p. m. or only little over 60 per cent of the average speed of the six-cylinder engines.

In studying the European light car it seems permissible to regard the British light car as typical.

Of a total of 133 models on the British market at the beginning of the current year, 76 or substantially more than one-half had a piston displacement of less than 120 cu. in., while the American car with the smallest piston displacement at that time, the Essex, had a displacement of 144.6 cu. in. Fifty of the British models had a displacement of less than 100 cu. in. Just what limits the class of light cars is hard to say. Limits have been set on the piston displacement of the different classes of vehicle for racing purposes, but these are not necessarily applicable to stock car engines. However, it seems that a piston displacement of 120 cu. in. may well be regarded as the practical limit of the light car class, particularly since this includes a little more than one-half of the total number of models. Of the British cars of this class one has as low a displacement as 45 cu. in. but the average displacement of all of the 76 models is 94 cu. in. This is approximately the displacement of a four-cylinder engine of 2¾ in. bore by 4 in. stroke. Our smaller cars of the four-cylinder type have bores of 3⅝ to 3¾ in. and a stroke of 4 in. There is a great advantage in the smaller bore in a country like England where the taxes are high and are based on the cylinder bore. The British tax is one pound sterling per year per rated horse power, and the rated horse power of a four-cylinder engine of 2¾ in. bore is 12.1 whereas that of a similar engine of 3¾ in. bore is 22.5, so that the saving on the annual tax in the case of the small displacement car is about $50.

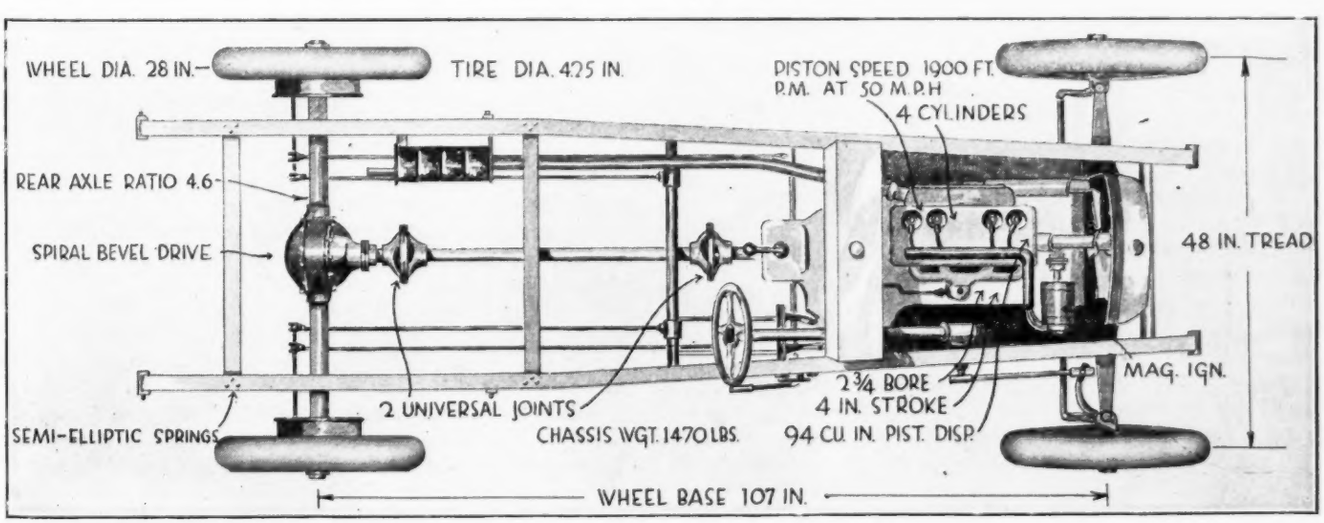


Among the 76 engines in the British small cars there are a few two-cylinder and a few six-cylinder models, but the great majority are of the four-cylinder type. Just what the average piston speed is it is impossible to say, because data on horse powers and speeds are lacking. It is necessarily a good deal higher than the average of American four-cylinder engines, because otherwise it would be entirely impossible to obtain satisfactory performance with these miniature engines. However, in view of the fact that 22 of the 76 engines have only splash lubrication it does not seem likely that the average speed can be very high. Many of the others have only a partial pressure system.

Twenty-eight of the engines have the valves in the cylinder head, 39 have L-head engines and the rest have either sleeve valves or some special arrangement of the poppet valves. Thus the L-head engine has almost twice the representation of the valve-in-head type. Thermo-siphon circulation is by far the most popular for this type of car, only 16 of the 76 models carrying water pumps. Practically all of the cars carry ignition magnetos, those with simple battery ignition being the exception.

Before going on with the details of the power plant and transmission, it may be well to discuss the other feature in respect to which the European light car differs radically from the American small car. All American cars, have either the standard tread of 56½ in. or a tread so close to it that they will readily follow the wagon tracks on country roads. European light cars, on the other hand, all have treads below the standard. The average tread for all of the British light cars is 48 in. and the great majority of them vary between 46 and 50 in.

A Composite European Light Car



In studying the European light car it seems permissible to regard the British light car as typical. The dimensions of the composite car presented here constitute averages compiled from a study of the 76 British cars carrying engines with a piston displacement of less than 120 cu. in. which were on the market at the beginning of 1926. The design characteristics included are those used by a majority of models, while the dimensions are an average for the whole group

That is, although there is no standard tread for these light cars, most of them do not vary much from the average. The average wheelbase of these cars is 107 in., which is somewhat longer than that of the average American four-cylinder small car. Having a longer wheelbase and a much narrower tread, the European light car conveys an impression of greater length and slimness and approaches more closely the relative proportions of our larger cars than do our own small cars.

Wheel Diameters

Wheel diameters on British light cars range from 26 to 31 in. and average 28 in., while tire diameters range between 3 and 5.25 in. and average 4.25 in. In connection with these figures the chassis weights are of interest. The lightest passenger chassis on the British market weighs only 620 lbs., the heaviest in the light car class weighs 2125 lbs. and the average weight is 1470 lbs. Some of the lightest models are provided with roadster bodies only, but most of them are regularly provided with four-passenger open and also with sedan bodies.

It has long been known that European drivers must use their gears much more than we do, and this naturally applies even more to the light cars than to the general average. Where much driving is to be done on the intermediate gears it is, of course, desirable that the steps between successive speeds be kept small so that the engine can be used to good advantage under practically all conditions. It is therefore not surprising to find that almost 50 per cent of these small cars have four-speed transmissions, the rest having three-speed gears. This may be regarded as another deviation from American practice, as there is no passenger car made in this country at present with more than three changes of gears. The large displacement of American cars renders this entirely unnecessary.

The final drive in the great majority of cases is by spiral bevel gear, though there is a fair number of worm drives and there are also two or three models with drive by straight bevel gears. Rear axle reduction ratios vary between 4 and 5.2, the average being 4.6. Since the average wheel diameter is 28 inches and the average reduction ratio 4.6, at 50 m.p.h., which is probably close to the average of the maximum speeds, the engine speed must be

$$N = \frac{50 \times 4.6 \times 12 \times 88}{28 \times 3.14} = 2{,}750 \text{ } r.\ p.\ m.$$

With an average stroke of 4.15 in. this gives an average piston speed of approximately 1900 ft. p. m. Of course, the assumption that 50 m.p.h. is the average maximum speed is somewhat arbitrary and may not be correct.

We found the average chassis weight to be 1470 lbs. Allowing 430 lbs. for the body and supplies and 600 lbs. for four passengers, the displacement per ton-foot figures out to

$$\frac{3825 \times 4.6 \times 94}{2500 \times 28} = 23.5$$

This compares with a displacement of 30 cu. in. and more per ton-foot of standard American passenger cars, from which it may be concluded that the European small car has not nearly the same snap or get-away that the average American car has.

Aside from the saving on the annual tax, the chief reason for fitting European light cars with engines of very small dimensions is that this tends toward greater fuel economy. With the automobile type of engine the efficiency or fuel economy decreases rather rapidly with a decrease in load, and it is obvious that for a car of given weight and gear ratio, the load factor of the engine is the greater the smaller the engine. The fuel mileages obtained with these light European cars are much better than we obtain with our cars, greater fuel consumption being the price we pay for increased flexibility and increased get-away or acceleration. The mileage figures for foreign cars look particularly impressive when given in terms of the Imperial gallon, which is 20 per cent larger than the U. S. gallon.

In the above it has been attempted to point out the chief dimensional characteristics of the European light car. There are, of course, many other features of construction in respect to which these small machines differ from our practice. Pressed steel engine pans, which are used on practically all American models, are a rarity abroad. The dash and instrument board are generally supported directly on the chassis frame instead of forming part of the body, etc. However, these features are characteristic not only of light cars but of European cars in general, and therefore need not be discussed here.

Dutch Professor Solidifies Helium

STUDENTS of thermo-dynamics will be interested in the announcement that helium has been solidified for the first time. The feat was accomplished by Prof. W. H. Keesom of the University of Leyden, Holland, who gives details of the experiments in a letter to *Nature* of London.

On June 25th helium was compressed in a narrow brass tube forming a connection between two tubes of German silver. The brass tubes and part of the two German silver tubes were immersed in a bath of liquid helium. When a pressure of 130 atmospheres was applied to the helium, the tube system appeared to become blocked, and when the pressure was lower by 1 or 2 atmospheres the system was open.

The temperature of the liquid helium bath was somewhat uncertain during this experiment. By a reduction of the pressure on the liquid helium bath the same phenomenon was observed at a temperature of about 3.2 deg. Cent. absolute at 86 atmospheres, and at a temperature of about 2.2 deg. at 50 atmospheres. On July 1 the experiment was repeated. At a temperature of 4.2 deg. the phenomenon occurred at 140 atmospheres, and at 1.1 deg. at 26 atmospheres.

Blocked by Solidification

From the regularity of these observations, it was concluded that the blocking of the tube system was being produced by the solidification of the helium. If the points are plotted, it will be found that the curve toward the origin tends to become parallel with the axis of temperature, and that it seems to imply that at absolute zero a pressure of some 16 atmospheres would be required to solidify helium.

Finally, Professor Keesom states, helium was compressed in a glass tube provided with a magnetic stirrer, and the observations were confirmed, the stirrer being seen to stick when the helium solidified. In one experiment part of the substance was solid and part liquid. It was found possible to hammer the solid block with the stirrer when the stirrer was in the liquid part. No limiting surface between the solid and liquid parts could, however, be seen.

Solid helium forms apparently a homogeneous transparent mass, having a refractive index, which differs only by an extremely small amount from that of liquid helium.

Just Among Ourselves

High Speed Production Hard on Older Workers

A LEADING Rochester manufacturer, according to the Executives Service Bulletin of the Metropolitan Life Insurance Co., recently expressed the opinion that manufacturers in the future will have to provide liberal pensions for old employees because the high speed production is making it difficult for the older men to keep pace. Particularly did he think this would be necessary where group payment schemes are in force because the younger men do not wish to carry the load of older workers who retard production. The prevalence of group payment methods in the automotive industry makes the remark of special interest, although it's a bit difficult to find logic clear through the statement.

* * *

Individual Efficiency Needed—Group or No Group

AN aged employee, if he is unable to keep up the production pace basically becomes economically unprofitable to the company, not merely to the set of younger workers with whom he is grouped, even in those group systems in which the company pays a given sum per piece regardless of the number of men used to produce it. The company would lose economically if it tried to force the retention in a group of any man—old or young—whose work slowed up the output of the group as a whole. On the other hand, the company cannot afford to have a man on a job in which he cannot produce efficiently even when payment is on an individual basis. It might keep an old employee working in such a case on the theory that it is cheaper to pay him a living wage and get some—although not efficient—productive effort from him than simply to pension him and receive no work from him. But the practical utility of such a course is doubtful. Even when a man is paid individually, when his efforts are related to those of other workers quite definitely, as they are in most production work, the ill effects of his inefficiency on others might well offset his productive effort.

* * *

Economies Usually Dominate Philanthropy

THE economic reason for more liberal pensions because of constantly speedier production would seem to be that of making this type of work more attractive. If the useful working life of a mechanic is constantly being shortened, it is reasonable to suppose that, in order to keep up the supply of workers, some new advantages will have to be offered to offset that particularly important disadvantage. The question might be viewed, of course, from a purely humanitarian point of view. Past experience indicates, however, that practical, economic considerations almost always have been at the bottom of all major moves in regard to human relationships in industry, whatever the surface indications may have been. Those industrial relations movements which have coincided with the advance of economic interests of the employer and of the employee are the ones which have survived for the most part; those which have had *only* a philanthropic or humanitarian application almost always have collapsed—usually to the relief and advantage of both management and workers.

* * *

Russians Start Automobile Museum

RUSSIA has an automobile museum. According to German sources, it was inaugurated recently at Moscow, No. 14 Sadowaja Street. The museum has several departments, including an engine department with 133 exhibits a carburetor department with 127 exhibits, a lubrication department with 109 exhibits, a radiator department with 40 exhibits, a chassis department with 109 exhibits, a propeller shaft department with 48 exhibits, a differential department with exhibits, etc. In addition there are sections for aeronautical, motorcyle and bicycle parts and equipment. A separate department has been arranged for catalogs. It is not quite clear from the above whether the museum has an historical or a commercial character, but most likely it is the latter.

* * *

Attractive Colors Help to Sell Trucks

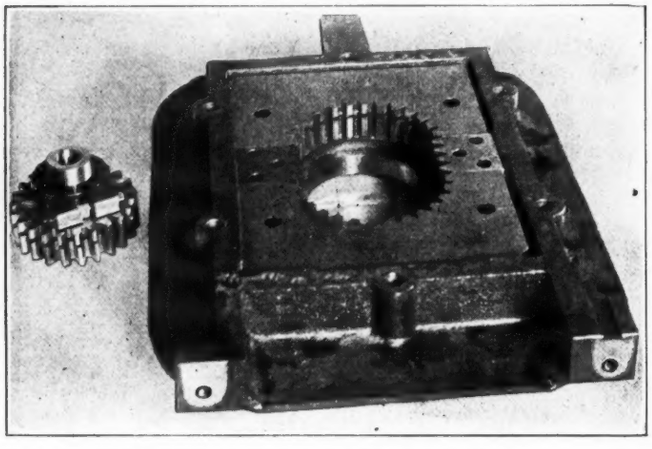
WHAT difference does it make how a truck looks so long as it will stand up and do its job day after day? Some of the more astute truck salesmen both in the field and at the factories are beginning to think it makes a good bit of difference. Once again the psychological reaction of human beings intrudes itself into an otherwise mechanical problem. Strange, how often this occurs. Anything is more attractive when it appeals to the eye instead of being hard to look at. Thousands of trucks and probably millions of passenger cars have been sold to users and have given satisfaction in spite of their lack of pulchritude, but the cost of selling them and keeping them sold might have been diminished by a better application of paint and trimming. This phase of passenger car design and sales has been developed to a marked degree in the last five years. It seems quite likely that similar advances will be noted in the truck field in the next decade. Some striking evidences of the possibilities along this line already exist.—N. G. S.

Worm and Gear Tooth Grinders are New Pratt & Whitney Products

Former unit finishes either or both sides of thread at once. Latter machine generates tooth involute by special mechanism.

A WORM grinder which operates entirely automatically on both single and multiple thread worms has been developed by the Pratt & Whitney Company, Hartford, Conn. It finishes either one or both sides of the worm in one operation, as desired.

The machine has a large bed which supports a sliding table and a wheel slide at right angles to each other. The table carries a work driving head and a tailstock. All controls are located on the front of the bed, and change gears provide for the necessary work speeds.



Master Gear and Master Path

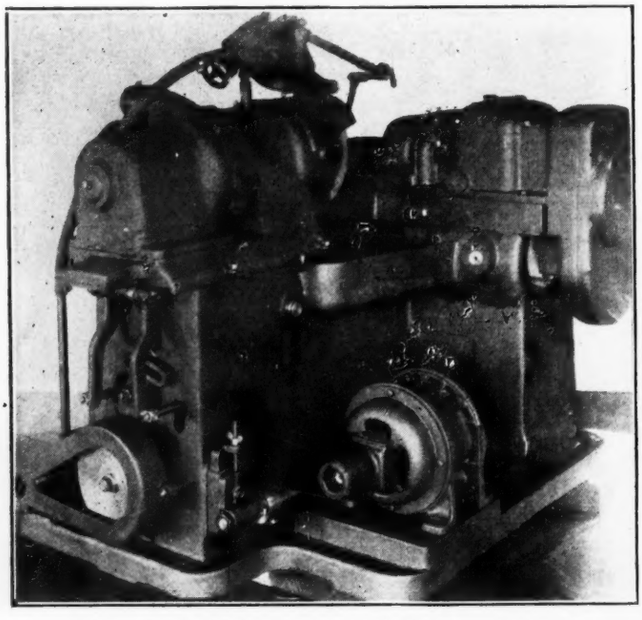
The new worm grinder is furnished only in motor-driven form. It requires a 5 hp. constant speed motor of 1200 r. p. m., either A. C. or D. C., with suitable starting and control equipment for all thread depths up to 0.400 in. Above this depth a larger motor may be required. The motor is mounted on a pad on the bed of the machine, and is belt-connected to the various moving parts. A friction clutch is provided in the machine for stopping and starting the work and the table movement.

The wheel head is so arranged that the grinding wheel can be swiveled to 30 deg. to the right and 45 deg. to the left, to accommodate any thread angle, and graduations are provided for accurate setting.

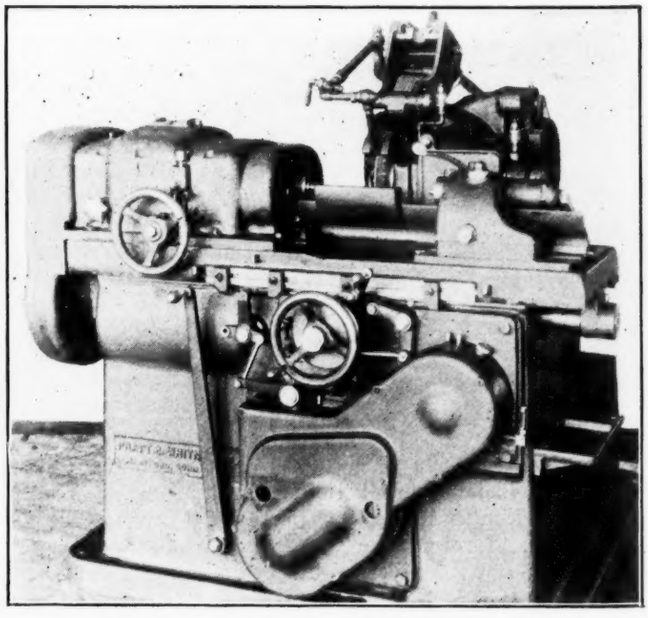
The drive to the wheel is through a pair of spiral bevel gears running in oil. These gears form the means by which the head may be rotated as previously mentioned. A belt inserted between these bevel gears and the grinding wheel insure a smooth drive. The wheel is fed to depth by means of a 4-pitch left-hand screw secured to a hand wheel on the front of the bed. A power feed ratchet having 200 teeth is also secured to this screw and is operated by dogs on the table. One tooth of this ratchet wheel is equal to a feed of .00025 in.

Grinds in One Direction

The machine is arranged to grind in one direction only. At the end of each stroke, after the grinding wheel has passed through the thread, the wheel slide is automatically withdrawn, the table returns to its starting point, and the wheel moves in again to the proper grinding depth.



Pratt & Whitney worm grinder, rear view



Pratt & Whitney automatic worm grinder

This movement is continuous as long as the machine is in operation. An additional advantage lies in the fact that the machine grinds on dead centers.

The table has a maximum travel of 7 in. and its movement is controlled by a cam. This cam is cut to suit the lead of the work being done and controls both the lead and the quick return of the table. This cam is hardened and ground and rotates at constant speed in the same direction.

The work head is connected to the lead cam through suitable gearing and is also tied in with the other movements of the machine, so that it is not possible for it to get out of time. A very simple and ingenious device takes care of the indexing of the work head for multiple threads. This indexing is accomplished by giving the gearing between the work head and the lead cam a fractional ratio, so that while the wheel is out of engagement with the work during the return stroke of the table, the work is automatically advanced through the fraction of a turn necessary to bring a new thread start in line with the wheel. An even ratio is necessary for single threads and a fractional ratio for multiple threads. This device does away with indexing mechanism. Worms with any number of threads may be ground as long as the lead angle range is not exceeded.

Hand Wheel on Work Head

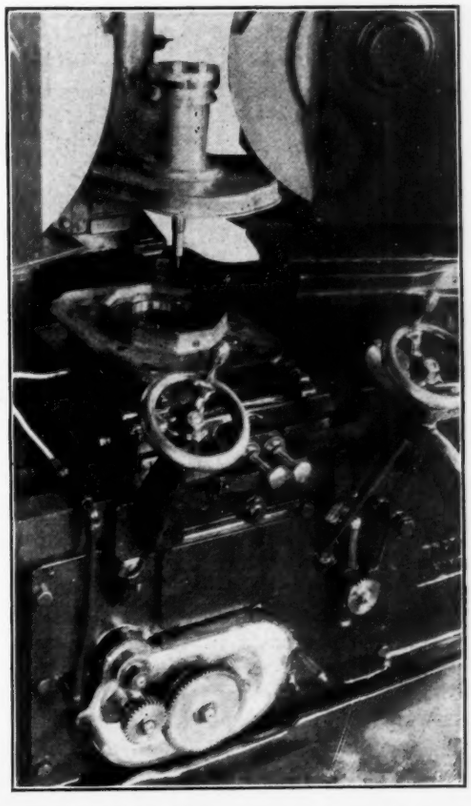
A hand wheel on the work head operates a differential gear which changes the relations between the lead of the work and the grinding wheel. This hand wheel provides a very easy means of picking up the lead when setting up a piece of work, and may also be used to give a longitudinal feed to the work when only one side of the thread is being ground.

The machine is equipped with a water pump, tank and suitable piping so that a continuous stream is delivered to the grinding wheel and is returned to the tank. A truing device is mounted above the wheel in such a way that it may be swung down when needed, but is entirely out of the way during grinding. This truing device uses the usual diamond, which is moved across the wheel face against two steel guiding pins. All moving parts of the machine are enclosed by metal guards.

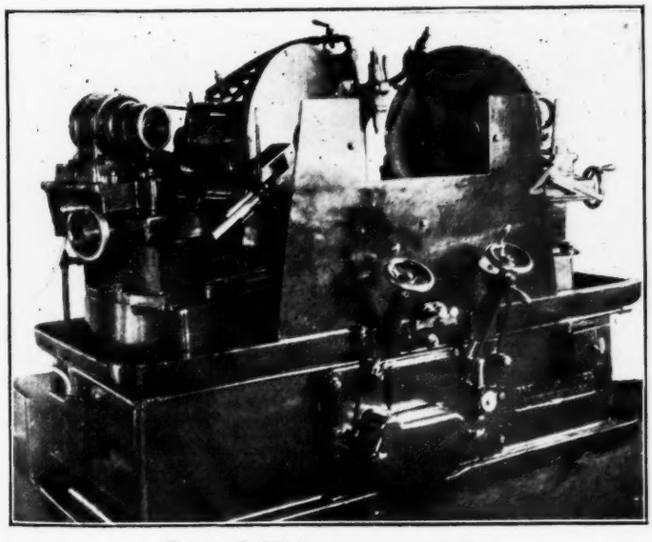
The machine has a maximum table travel of 7 in., can accommodate work up to 5 in. diameter and cut threads to 0.4 in. in depth. The main drive shaft (inside the machine) has a speed of 350 r. p. m., the wheel turns at 1620 r. p. m. and the work may be rotated at any one of five speeds ranging from 24 to 122 r. p. m. A 14 in. wheel is used. The machine is regularly furnished with one lead cam which is made specially to suit the pitch and number of starts. Other equipment includes change gears, a wheel truing device, two work arbors (or, alternately, special centers), two driving dogs, one locating fixture and one set of wrenches.

A gear tooth grinder developed by Pratt & Whitney and of which several are in use in its own shops, makes use of two large disc-type grinding wheels which come in contact alternately with the gear teeth to be ground, in such a way as to generate a true involute within very close tolerances.

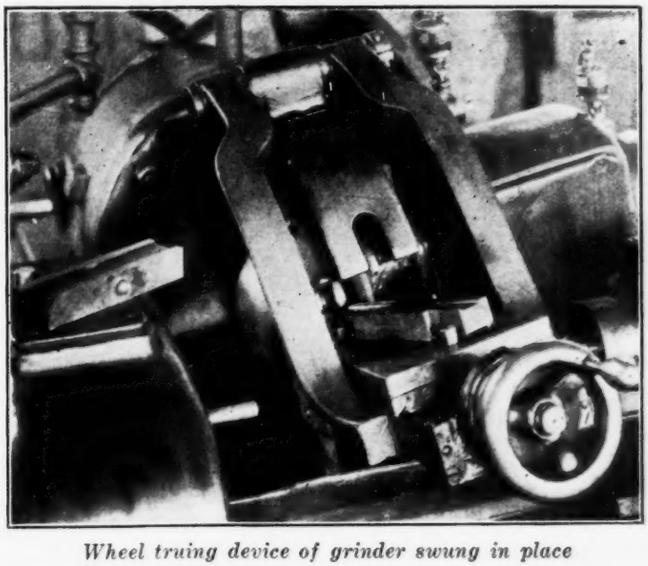
The gear to be ground is held between centers on a rigidly hinged oscillating arm. This arm is free to move in any direction horizontally, but its movement is positively controlled by a master gear and a master gear path.



Showing master gear and path



Pratt & Whitney gear grinder

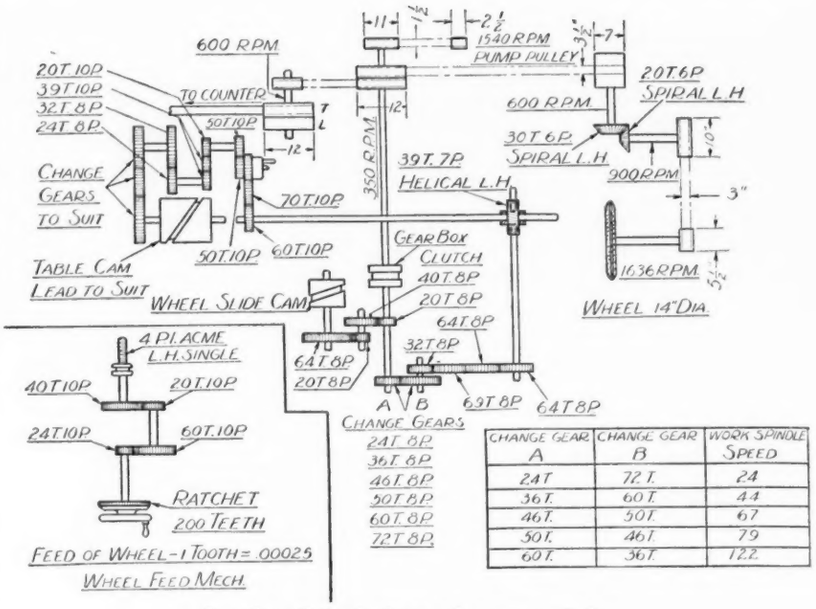


Wheel truing device of grinder swung in place

This path is nearly elliptical in shape and is so arranged that the gear to be ground is rolled first past one grinding wheel and then past the other, grinding both sides of each tooth. The movement is continuous, and a different tooth is ground at each pass of the work. Thus the work is carried around its orbit path in such a way that the gear being ground rolls into contact with the grinding wheels in the same manner as with a rack tooth, and true involute profiles are generated.

Each grinding wheel is driven by a separate motor. Graduated slides are arranged so the wheels may be adjusted to the necessary angle for grinding, and the entire head may be moved in and out to bring its wheels into contact with the work. Each wheel is completely guarded.

A truing device is mounted at the rear of each wheel. This device carries the usual diamond point, and is traversed across the face of the wheel by a rack and pinion mechanism operated by a hand lever. The wheels are trued to a flat surface.



CHANGE GEAR A	CHANGE GEAR B	WORK SPINDLE SPEED
24T	72T.	24
36T.	60T.	44
46T.	50T.	67
50T.	46T.	79
60T.	36T.	122

Speed and feed chart of worm grinder

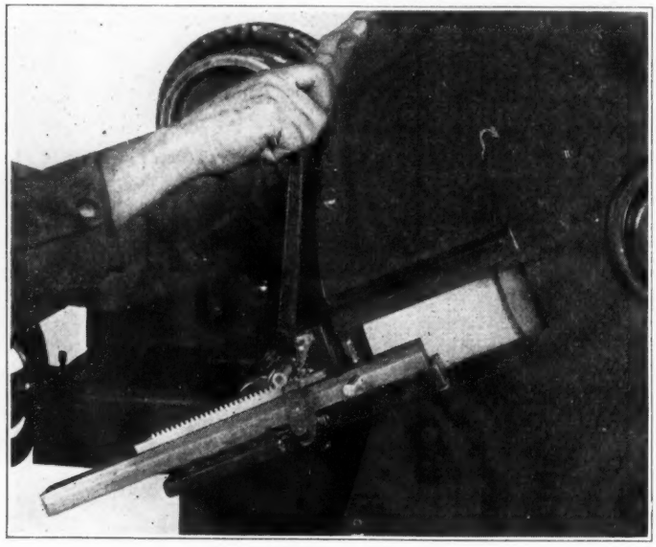
The master gear path and gear consists of the divided halves of an internal gear, separated on each side by a small rack section called the master rack. The master gear, master rack and the divided internal gear are all of the same diametral pitch as the gear being ground. It is necessary to have a special path and master gear for each gear in production.

The master gear always has the same number of teeth and the same nominal pitch as the gear being ground. The master path usually has 13 teeth more than its own particular master gear, so that each time the gear being ground comes into contact with the same grinding wheel, it has indexed 13 teeth. Whenever the gear being ground has a number of teeth which is a multiple of 13, it is necessary to index by an amount which has no factor in common with this number of teeth.

A separate motor drives the oscillating work arm and operates the power feed. Suitable clutches are provided, and all controls are conveniently grouped at the front of the machine. The machine grinds spur gears only and is essentially a single purpose machine for high production, since it requires a special master path and master gear for each gear being ground. The machine itself, however, is adjustable for different gears.

When not more than 0.006 in. of stock is to be removed the machine will average three teeth per minute. A loading fixture is employed to enable the gears to be placed in the machine in correct relation to the wheels. As regards accuracy, it is claimed that this machine, when operating at the rate of production above mentioned, will turn out gears which are accurate in tooth profile, spacing, etc., to within 0.0002 in. It is possible to hold the work to still finer tolerances, but the rate of production will then be lowered.

In the case of gears of 12 d. p. the limits in respect to diameters are 2 in. pitch diameter and 9½ in. outside diameter. The limits on the diametral pitch are 4 and 12, the limits on the pressure angle, 14½ deg. and 25 deg. Gears up to 1¼ in. face width can be ground with the standard depth of space—wider gears with increased cutting depth.



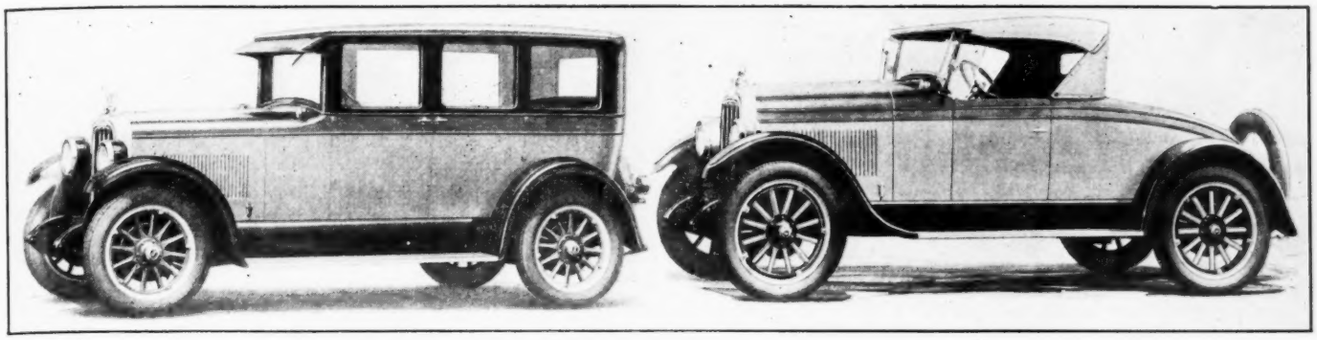
Truing device for gear grinder

Measuring Bearing Lubrication

IT has been suggested repeatedly that the lubrication of a bearing might be judged by the electrical resistance of the oil film between journal and bearing, after the specific resistance of the oil used has been once determined. Experiment has shown, however, that conductivity is no proper criterion of film thickness, as it varies rapidly with temperature and contamination.

In a paper presented at the meeting of the German Chemists Association in Kiel it was suggested by H. Schering and R. Vieweg that the electrostatic capacity of the condenser formed by the lubricated bearing could be used for the purpose. The dielectric constant upon which this capacity depends is practically independent of temperature, contamination, and moisture content.

By a simple measurement of the capacity with a telephone or buzzer it is possible to determine the mean clearance and the film thickness within the range of flood lubrication up to the point where the so-called boundary lubrication begins, and thus arrive at a correct estimate of the character of the lubrication.



Chandler Special Sedan

The New Standard Roadster

Chandler Extends Line *to* Include Three Chassis Models

All cars manufactured by organization hereafter will carry Chandler name-plate. Nineteen body styles.

THE Chandler line for 1927, as announced briefly in our news columns last week, consists of 19 body styles mounted on three different chassis—the Big Six, Special Six and Standard Six. Prices on the Big Six have been reduced by amounts ranging from $15 to $360, and it is announced that all cars manufactured hereafter by the Chandler-Cleveland Motors Corp. will carry the Chandler name-plate.

The Special and Standard Six series are new chassis to bear the Chandler name. The former has a 3⅛ by 4¾ in. engine mounted on a 116 in. wheelbase chassis and the latter is powered by a 3 1-16 by 4½ in. engine fitted to a 109 in. chassis.

In addition to many optional color combinations, the composite type bodies carry a double beading and the contour of the upper structure is designed to give the impression of length. The appearance of the new models is further enhanced by an embossed radiator, with the tri-panel effect previously used and by the American eagle emblem which is mounted on a bar radiator cap.

Four-wheel brakes of the mechanical external contracting type are now offered as regular equipment on all three chassis models. Other improvements common to all chassis include an AC air cleaner, an oil filter of the same make and a Bishop & Babcock water temperature regulator of the thermostatic type.

On the Big Six chassis changes have been made in the engine oiling system, while added smoothness has been obtained through revisions made on the crankshaft. In addition, the crankcase drain has been arranged so that it may be opened from above. A more rigid frame structure has been secured by the installation of a tubular cross member located just ahead of the spring shackle anchorages.

A new four-passenger coupe on the Big Six chassis is finished in two-tone Sheridan and silver gray, set off with a black bead molding with special striping. The wood wheels are in Sheridan gray with a gold stripe. Interior specifications include walnut finished inlaid door panels, walnut finished instrument board and upholstery of blue-gray mohair.

The metropolitan sedan on the Big Six chassis now has narrow corner pillars and is finished in lotus blue below with black on the upper structure. Added effect is secured by edging the window ledges in lotus blue. An optional color choice of two-toned silver gray and Sheridan gray with the color-edged windows is also offered. The Metropolitan sedan, seven-passenger sedan and four-passenger coupe on the Big Six chassis are all equipped with instrument board type temperature and gasoline gages. A rear stoplight is regular equipment on all of the Big Six models.

Several of the constructional features formerly characteristic of the Chandler are now incorporated in the Standard and Special chassis. These include the self-adjusting shackle bolts and steering gear column provided with flexible joint. One-shot lubrication is standard on all models.

Five body models are offered on the Special Six chassis. The sedan is finished in two-tone sage brush green. The two-passenger coupe is in two-tone blue and buff and black wheels, with an option of two-tone Brewster green and sage brush green. The de luxe two-passenger coupe is in two-tone green with striped black bead and gold-striped brewster green wheels. The five-passenger touring is in two-tone brown, while the sport touring has a two-tone sage brush green exterior finish set off by a full length beading of dark green. The sport touring carries disk wheels.

The rumble seat sport roadster, which is one of the seven models on the Standard Six chassis, is finished with biege brown upper structure and Nevada gray below the upper bead. The wheels are wood in natural finish and the upholstery is hand-buffed Spanish leather, The two-passenger coupe is finished in blue and buff and black wheels, with a color option of two-tone Brewster green and sage brush green. Upholstery on this model is hand-buffed Spanish leather with corduroy optional.

S. A. E. Standards Committee Adopts Rockwell Hardness Test

This is the third hardness testing method recognized by the Committee. It measures hardness by depth of penetration of a steel ball or diamond cone under heavy load.

THE Iron and Steel Division of the S. A. E. Standards Committee has decided to add the Rockwell hardness test to the other methods recognized and recommended by it, namely, the Brinell and the Shore. The Division has issued the following information on this test:

Principle of Test.—The Rockwell tester measures hardness by determining the depth of penetration of a steel ball or diamond cone in the material being tested under certain conditions of load application. In elevating the work to testing position, the machine first applies a preliminary, or minor, load of 10 kg. (22.046 lb.), which clamps and seats the piece being tested and allows the penetrator to break through the light scale and come in contact with the true material beneath. The direct-reading dial is set to zero penetration, directly after due application of the minor load. With the minor load applied and a zero penetration reading known, a final or major load is applied. This forces the penetrator into the metal being tested. The indication at this time on the direct-reading dial comprises not alone the depth of penetration but also the deformation of the testing-machine frame and components, and the work undergoing test. The true Rockwell hardness is read directly from the dial, after removing the major load. This automatically reinstates the 10-kg. (22.046-lb.) minor load and removes the deformation of the machine and part under test. The result is the permanent deformation of the tested metal due to the penetrator and its major load. The Rockwell hardness-readings are based on the depth to which the major load forces the penetrator below the point it was forced previously by the minor load.

Methods of Testing

Preparation of Surfaces.—A surface similar to that obtained by rough-grinding with a sandstone, carefully cooling the pieces in water to prevent change in hardness due to the heat of grinding, is sufficient for research work. In production it is customary to remove the heavy scale only, as a polished surface is unnecessary.

Thickness of Specimens.—Practically any thickness in excess of 0.020 in. can be tested for comparative hardness. For true hardness, the piece must be of such thickness that the under surface of the specimen, after testing, does not show a point of compression. The minimum possible thickness of any specimen varies according to the hardness, the load applied and the kind of test-point or penetrator used. The hardest steels give true hardness-readings if over 0.027 in. in thickness.

Curved Surfaces.—The true hardness of parts having curved surfaces can be found if the radius of curvature of the surface at the point tested is 3/16 in. If the radius is less than 3/16 in., only comparative results can be obtained. Data for hardness-tests on a highly curved surface should be accompanied by a statement of the radius of curvature. In testing small rounds, the effect of curvature can be eliminated by making a small flat-spot on the specimen.

Rockwell Scales.—Since two loads and two penetrators are used, two scales of hardness are placed on the dial of the machine. The black divisions and the letter C apply when the 120-deg. diamond-cone penetrator and the 150-kg. (330.693-lb.) load are employed. The red divisions and the letter B apply when the 100-kg. (220.462-lb.) load and the 1/16-in. steel-ball penetrator are employed. All data should be prefixed by a letter showing whether the values are on the C or the B scale. Other loads and penetrators can be used, but only comparative results can be obtained. In recording such results all factors relating to them should be clearly stated; the load; the penetrator; the scale used; the thickness of the piece, if very thin; and the curvature of the surface.

Penetrators for Hard and Soft Metals

Penetrators and Loads.—The Rockwell scale being based on depth measurements, the diamond-cone gives the more accurate readings on hard metals and the steel-ball on soft metals. Hard metals require the 150-kg. (330.693-lb.) load; the diamond-cone penetrator of 120-deg. angle, the point of which is ground spherical by the maker, is the standard Rockwell diamond-cone.

If the readings are below C-25, it is preferable to test the material with the 100-kg. (220-462-lb.) load and the 1/16-in. steel-ball, and use the B scale. Readings on the B scale are not generally taken higher than B-100, when it is advisable to change to the C scale with the 150-kg. (330.693-lb.) load and the diamond-cone test-point.

Each tester is provided with means for regulating the rate of application of the load, for which the standard speed is 5 sec. for production-testing on steel. A speed of 3 sec. can be used without appreciably affecting the readings. Metals that flow readily under pressure, like zinc, should be tested under a specified rate and the duration of the application of the load should also be specified.

Chucking the Work.—Parts with much overhang should be suitably supported so that, when the minor load is applied, the work will be held rigidly. The piece being tested, while under the pressure of only the minor load, must be secure so that it will not tend to tip at the edge of the anvil and move laterally under the major load.

The surface tested should not vary from the horizontal with reference to the vertical axis of the penetrator more than 7½ deg. In testing cylindrical pieces, such as wire, an anvil provided with a V-notch should be used and the point of penetration applied vertically over the center of the piece. The under-surface of the piece, where it rests

on the anvil, must be free from scale or burrs that might collapse or flatten during the test.

In testing tubing or any shape that will deform under test, a blunt nose should be used in place of the penetrator, and the test conducted in the regular way to determine if the specimen takes a permanent set, that would invalidate the hardness-test and necessitate consideration of another manner of chucking.

Homogeneity of Metals.—The Rockwell tester measures the hardness of the specimen at the point of penetration, but the reading is also influenced by the hardness of the material under the impression. For example, in testing the hardness of carbon steels, the depth of penetration, when using a diamond-cone and the 150-kg (330.693) load, is about 0.027 in., but, if any softer layer is located within 0.027 in. of the impression, the impression will be deeper and the apparent hardness less. Therefore, due regard for this condition must be given when testing material with a superficial hardness, such as a cyanided surface.

Comparison of Readings

Conversion to Other Methods of Hardness-Testing.—Care should be used in converting readings from one method of hardness-testing to another. The factors that cause erroneous conversions are:

Lack of true homogeneity in metals.

Different depths from the surface at which various hardness-tests operate.

Different physical characteristics of various testing devices.

Different properties that are assumed by different metals under cold-working.

No one conversion-table is practical for close conversion on all metals. Tables and formulas have been compiled for some materials that can be used as guides. When conversion is necessary, it is advisable to make such conversion for each particular type of metal and each condition of heat-treatment or mechanical work.

The sub-division on Paints, Varnishes and Enamels of the Passenger Car Body Division has been carrying on tests on black baking enamels. A total of 243 test panels have been subjected to exposure, and a meeting was held on July 15 to inspect the panels, which have been out since early in June. No rusting was observable on any of the specimens as yet, but there were indications of surface checking on all of them. The tests will be continued for a year, with periodical inspections.

Drafting Room Standards

A Sectional Committee of the American Engineering Standards Committee is being organized by the American Society of Mechanical Engineers and the Society for the Promotion of Engineering Education, to formulate national standards for drawings and drafting-room practice. The S. A. E. also will have a representative on this committee. The scope of the committee's project is given as the classification of and corresponding nomenclature for drawings in accordance with their purpose; method of representation of the subject, including arrangement of views and sections; use of lines of different kinds and thicknesses; indication of dimensions, tolerances and fits, tapers and slopes, and surface or finish; symbols for elements; indication of materials by cross-hatching; arrangement of border-line, title, part list, notes, changes, and revisions; method of folding and punching; kinds and sizes of lettering, figures and symbols; scales of reduction and enlargement; sizes of drawings and filing cabinets; width of rolls of paper and cloth; size of drafting equipment and tools, and specifications for materials to be used for drawings and drafting.

The S. A. E. also has accepted joint sponsorship with the American Society of Mechanical Engineers and the National Machine Tool Builders Association for the standardization of small tools and machine tool elements. The Sectional Committee on Small Tools and Machine Tool Elements at the present time has under consideration standardization of T-slots and parts.

Flow of Low Carbon Steels

FROM an investigation to determine the flow of low carbon steels at various temperatures, made at the Bureau of Standards by H. J. French and W. A. Tucker the following conclusions are drawn.

By flow is to be understood the extension of the test piece:

1. The total flow producing fracture when low-carbon steel is subjected to a fixed total load in tension at approximately constant temperature takes place in three distinct steps, the importance of which vary with the applied load and temperature.

2. These three stages of flow are (1) an initial flow; (2) a secondary flow at fairly constant rate, which is also considerably less than the rate during the first and third periods; and (3) a final rapid flow just before fracture.

3. As the constant applied load is increased, the initial flow and the rate of flow in the second period increase and the life of the steel decreases. The final rapid flow begins when the reduction in cross section accompanying appreciable elongation has raised the unit stress to a definite load at each temperature.

4. The relation between decrease in applied load and increase in life is approximately hyperbolic.

5. At atmospheric temperatures there is a small difference in the loads permitting very long life and those producing fracture in a few moments. As the temperature is raised the increase in life with decrease in applied load becomes more gradual. An important effect in temperature increase is to reduce the strain hardening ability of the steel. This is a maximum at ordinary temperatures and decrease until it becomes zero in the neighborhood of 750 to 800 deg. Fahr. (400 to 425 deg. C.). As a result the principal factor governing the maximum allowable stress varies with temperature and the type of service. When long life and freedom from appreciable deformation are required, the maximum allowable load closely approximates the proportional limit of the authors' short-time tests and similar tests at corresponding temperatures carried out independently at another laboratory. These proportional limits were found to closely approximate the maximum allowable stress values successfully used by an engineer for the design of commercial equipment operating at high temperatures. In the range 70 to about 600 deg. Fahr. (20 to 315 deg. C.) higher working stresses can be used if appreciable deformation can be taken care of and long life is the primary requirement.

The investigation is reported in detail in Technologic Paper No. 296 of the Bureau of Standards.

AT the time the British Air Ministry announced the conditions of its competition for helicopters it was commented that there was little likelihood of these conditions being fulfilled within the time limit set and of the prize being won. The time limit expired on April 30 last and the Air Ministry now announces that applications to enter machines had been received from 34 competitors, but only one competitor actually submitted a machine and that did not carry out any of the tests prescribed. It has been decided not to renew the competition.

U. S. Exports of Cars, Trucks, Tires and Parts for

COUNTRIES	GASOLINE PASSENGER CARS										TRUCKS					
	Up to $500		$500 to $800		$800 to $1200		$1200 to $2000		Over $2000		Up to 1 ton		1 to 2½ Tons		Over 2½ Tons	
	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value
Austria	386	$166,258	22	$16,534	9	$9,956	8	$11,424	1	$2,062	4	$2,826	2	$2,792		
Azores and Madeira Islands	45	18,736	6	4,230	4	3,983		1,297			21	9,461	2	2,476	2	$2,984
Belgium	1,234	557,114	537	416,577	1,350	1,507,432	343	569,139	120	323,271	1,720	659,571	2	1,108		
Bulgaria			9	6,994	9	9,158	2	3,008								
Czecho Slovakia	3	1,260	39	31,571	34	37,581	20	31,091	5	12,066						
Denmark	5,623	2,271,292	1,101	858,438	605	625,661	78	120,883	45	128,043	2,422	980,834	58	82,858	5	10,872
Esthonia																
Finland	64	32,273	251	179,855	293	307,201	103	157,539	20	52,616	21	26,232	55	75,058		
France	19	7,465	117	96,509	217	242,554	81	127,066	67	187,846	45	23,977				
Germany	81	29,786	557	398,837	406	419,801	82	106,105	126	328,674	690	254,232	10	12,623	2	3,997
Gibraltrar			2	1,495	1	934	2	3,117	2	5,000						
Greece	1	500	4	2,703	2	2,028	5	7,511	2	8,200			1	1,100		
Hungary	14	7,015	20	13,868	33	36,924	9	15,770								
Iceland and Faroe Islands	8	3,950	4	3,077	2	2,178	1	1,382					1	598		
Italy	3,469	1,042,760	19	13,470	37	39,382	7	10,515	16	54,242	1,134	291,161	6	7,683		
Latvia			19	14,771	28	29,364	9	14,253								
Lithuania			14	8,895	5	5,471										
Malta, Gozo and Cyprus Islands	25	9,983	18	12,075	5	5,089	2	2,747								
Netherlands	10	4,378	355	268,231	530	568,462	209	324,687	69	211,816	15	7,357	108	143,323	2	4,600
Norway	105	48,267	192	136,872	170	171,159	38	57,409	15	48,934	26	26,458	72	109,827	5	16,656
Poland and Danzig	2	776	6	4,094	2	2,343	1	1,686	1	3,400			1	3,000		
Portugal	153	72,108	100	75,552	123	132,516	54	84,189	12	32,046	62	34,241	9	9,264	2	8,646
Rumania	1	335	97	73,405	101	109,927	44	71,037	13	35,454						
Russia	8	3,568	4	3,264	12	10,678	2	3,456	18	51,046	166	18,628	1	1,060	4	23,230
Spain	643	220,259	606	457,607	730	784,258	361	560,303	137	385,852	1,108	463,370	123	129,834	23	82,423
Sweden	81	37,655	981	713,579	852	883,602	162	243,893	81	216,912	51	38,180	159	177,554		
Switzerland	4	2,316	146	111,273	251	281,845	167	258,201	79	198,009	6	3,545	3	3,530		
Turkey	23	11,404	8	5,645	13	12,583	9	12,990			10	4,825	29	19,840		
United Kingdom	100	39,256	1,140	725,260	667	653,431	195	312,202	133	376,132	2,845	1,290,268	663	811,891	17	26,064
Irish Free State	26	2,832	37	29,166	12	12,555					7	4,176	3	3,139		
Yugoslavia	29	13,631	52	38,473	13	13,649	6	8,950	4	10,458	3	2,566	1	1,700	19	49,037
United States																
British Honduras	14	5,253	1	695							3	1,206				
Canada	1,775	579,833	7,939	4,721,955	4,363	4,264,789	1,087	1,648,023	501	1,356,947	513	454,238	967	1,265,923	160	562,300
Costa Rica	3	1,140	41	29,374	31	31,173	12	19,387			16	12,213	16	18,085	1	1,632
Guatemala	15	6,984	47	36,347	79	85,524	41	59,594	14	36,585	57	32,564	74	117,360	1	4,200
Honduras	30	11,982	8	5,270	4	3,527					10	4,817	3	3,853		
Nicaragua	5	2,146	20	14,176	31	32,793	11	15,628			2	1,038	7	8,994		
Panama	163	67,651	74	53,868	95	103,739	20	29,871	6	14,129	89	52,617	27	36,575	4	12,320
Salvador	16	5,918	58	42,668	61	64,902	24	35,992	16	40,000	22	13,288	41	84,333	24	79,843
Mexico	3,429	1,151,258	1,281	860,145	879	878,523	276	403,716	151	416,967	842	544,634	243	353,755	74	256,510
Miquelon			1	602												
Newfoundland	26	10,578	59	40,872	38	40,688	2	3,158	1	2,597	11	2,764				
Barbados	17	8,213	13	9,523	11	11,806	5	7,033					1	1,178	1	1,388
Jamaica	161	62,709	164	106,995	60	60,878	15	21,750	2	4,936	112	41,487	11	16,082		
Trinidad and Tobago	38	18,023	24	16,052	16	15,583	3	4,195			8	6,091	9	10,251		
Other British West Indies	64	22,242	17	11,443	21	21,505	9	13,998			41	18,246	1	1,400		
Cuba	1,379	503,342	565	380,264	271	264,728	94	143,556	83	242,511	832	287,821	141	181,540	65	290,113
Dominican Republic	269	111,631	30	22,043	43	44,420	16	23,456	8	21,994	127	56,870	14	29,378	5	17,158
Dutch West Indies	10	3,962	12	8,669	25	25,873	7	9,852	1	2,500	47	17,543	11	22,178		
French West Indies					1	1,014										
Haiti	66	24,634	65	47,343	53	52,235	8	11,448	6	15,229	80	40,566	35	49,436	2	9,490
Virgin Islands	10	3,761	7	4,746							1	458				
Argentina	8,257	3,474,576	3,555	2,470,007	2,041	2,164,526	690	1,046,109	230	641,072	1,343	539,093	181	376,227	73	247,526
Bolivia			10	8,174	45	49,934	5	6,959	8	21,375	12	8,981	35	56,351	1	4,405
Brazil	6,250	2,194,30.	1,482	1,067,738	1,118	1,167,455	341	508,287	203	546,688	1,629	615,724	92	103,442	38	164,171
Chile	272	73,768	140	101,334	135	137,434	71	105,756	17	47,133	302	118,012	154	207,747	78	229,840
Colombia	267	110,549	176	126,783	245	265,613	97	150,269	39	116,142	324	154,480	281	371,097	30	98,459
Ecuador	26	9,840	9	6,591	15	15,395	13	18,726			4	3,360	3	6,823	1	7,038
Falkland Islands											28	12,088				
British Guiana			7	4,861	4	4,054	1	1,525					2	2,094		
French Guiana											12	5,808				
Dutch Guiana	10	3,794			1	1,190	1	2,098	1	2,273	3	1,264				
Paraguay	26	9,434			4	4,141					34	12,176				
Peru	332	132,686	110	77,553	177	181,935	37	54,158	20	56,900	358	166,482	318	397,843	9	23,523
Uruguay	2,289	674,600	310	224,356	279	290,820	109	163,518	22	62,845	355	115,166	94	77,126	8	24,383
Venezuela	361	132,923	165	120,411	529	531,303	67	98,365	34	90,963	444	200,557	135	198,511	29	114,773
Aden	16	8,314	8	4,551	1	893										
British India	165	74,337	578	432,650	493	524,704	73	109,623	4	10,875	629	481,916	73	87,336		
Ceylon	92	41,666	192	146,293	151	153,843	26	37,811	3	8,765	148	115,600	88	109,335	25	34,454
Straits Settlements	168	74,259	299	230,141	200	212,827	13	20,314	8	20,000	7	6,274	53	78,746	9	23,985
China	276	99,796	230	175,335	267	276,821	43	64,240	16	40,213	224	104,741	49	57,777	3	3,839
Java and Madura	115	51,857	654	479,709	468	463,194	97	146,127	26	66,090	55	40,311	44	43,710		
Other Dutch East Indies	33	15,813	128	92,421	66	64,789	8	11,930	5	12,567	25	21,099	54	65,158		
French Indo China	5	1,880	6	4,789							12	4,224				
Hejaz, Arabia and Iraq	225	82,204	29	21,542	24	25,73.	5	6,298			14	10,903			2	5,076
Hongkong	51	17,988	6	5,110	19	17,606	2	2,703			26	10,132	2	2,512		
Japan	184	57,137	179	130,149	422	432,798	51	82,674	58	154,983	17	7,055	27	33,248	8	22,919
Kwangtung	71	27,866	26	19,097	5	5,461	8	10,324			15	8,473	5	8,157	2	3,850
Palestine and Syria	411	141,705	121	86,871	143	140,778	26	39,444			30	24,001	10	11,318	1	13,200
Persia	99	36,178	1	763	5	4,571					6	4,617			20	66,600
Philippine Islands	1,152	437,017	422	316,689	374	402,399	59	87,458	32	84,177	472	179,389	104	132,838	7	17,063
Siam	26	12,250	23	16,999	2	2,232										
Turkey	38	18,574	2	1,627	2	2,040					14	7,469				
Other Asia			2	1,153												
Australia	6,860	2,571,560	6,248	4,226,631	5,242	5,697,904	473	720,452	353	938,972	5,927	3,042,382	672	879,813	306	798,092
New Zealand	1,585	719,784	925	667,429	1,755	1,986,518	171	266,065	70	174,246	781	351,949	236	316,753	55	118,677
British Oceania	18	8,078	34	25,164	12	11,849	4	6,011			12	5,835	5	4,971		
French Oceania	7	3,367	2	1,400	1	895	2	3,000			3	3,367				
Other Oceania																
Belgian Congo	24	9,712	4	2,871	2	2,251					67	23,069			6	19,812
British West Africa	28	11,110	31	22,793	37	38,831	4	5,730			146	118,850	236	264,316		
British South Africa	1,454	671,581	2,078	1,479,027	3,129	3,449,288	188	278,450	9	26,303	466	258,222	123	159,264	18	55,661
British East Africa	94	41,841	124	94,574	140	135,901	19	30,699			148	88,279	24	30,167	2	6,015
Canary Islands	1	324	26	18,967	32	32,298	11	16,823	4	11,276			9	9,878		
Egypt	107	31,863	70	48,783	46	49,476	9	12,759			164	49,180	1	996		
Algeria and Tunis	19	7,300			6	6,964	3	6,284			3	1,212				
Other French Africa	139	43,123	9	6,334	1	1,100					264	103,163	15	15,202		
Italian Africa			1	800												
Liberia	9	3,875									7	3,633	5	2,574		
Madagascar																
Morocco	188	72,368	9	6,822	18	19,341					52	20,903				
Portuguese East Africa	21	9,716	22	14,879	109	128,219			1	2,300			10	22,001		
Other Portuguese Africa	38	17,025	16	11,978	4	4,142					66	31,991	34	33,229	2	10,820
Spanish Africa			8	5,51.	1	948							1	1,075		
Total	51,456	$19,444,382	35,366	$24,143,034	30,348	$32,035,795	6,358	$9,693,406	2,918	$7,962,632	27,817	$12,811,799	6,085	$7,968,214	1,151	$3,577,644

First Six Months 1926 | Canadian Exports

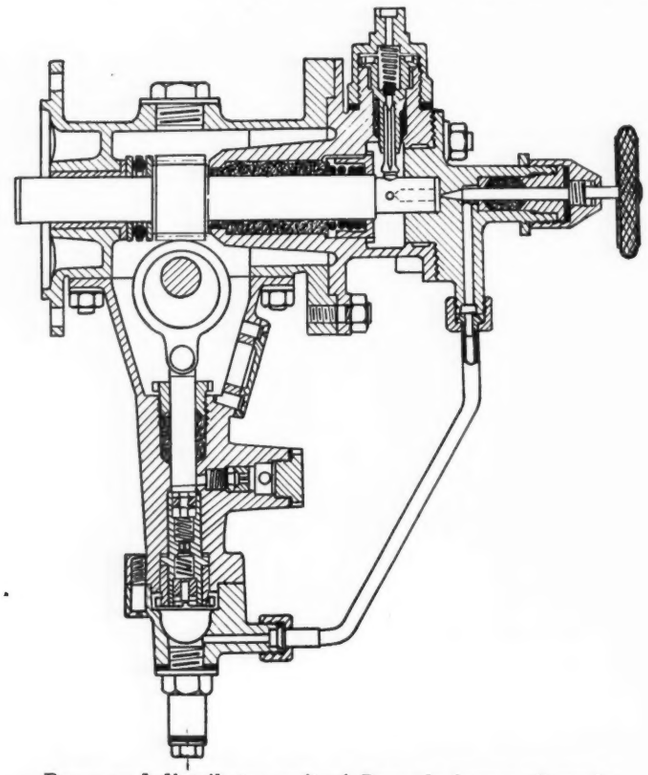
ELECTRIC VEHICLES		PARTS	TIRES						PASSENGER CARS						TRUCKS		PARTS	COUNTRIES
			Casings		Inners		Solids		Up to $500		$500 to $1000		Over $1000					
No.	Value	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	Value	
		$11,644	1,980	$45,142	1,408	$5,079	40	$1,532	21	$6,941					20	$6,880	$20	Austria
		8,959	194	2,685	221	614												Azores and Madeira Islands
		1,378,624	11,306	251,467	8,259	25,282	99	6,136	15	5,368	25	$18,655	16	$20,492			162,897	Belgium
		1,101	56	960	73	215			4	1,681					8	3,511		Bulgaria
		18,810	5,055	146,920	3,996	14,814	485	24,476										Czecho Slovakia
		3,396,549	24,825	313,356	23,080	46,046	341	9,303									196,031	Denmark
		1,731																Esthonia
		85,348	7,245	160,484	6,596	21,412	60	2,817	1	490	59	22,422	15	15,962			133	Finland
		1,831,672	12,259	264,989	6,285	33,220	34	1,204			45	38,046						France
		445,967	26,853	719,114	22,829	97,908	31	1,607	3	1,134	13	11,250	19	26,671			28,676	Germany
		1,983	4	105	8	33												Gibraltar
		35,834	3,185	58,479	1,283	3,965	130	4,681										Greece
		3,866	797	14,247	960	2,635											129	Hungary
		3,042	370	7,641	536	1,209							14	18,537			19	Iceland and Faroe Islands
		793,838	2,196	46,474	2,059	6,901	24	997	2	863	2	1,798					272	Italy
		2,111	301	7,020	97	328	10	430										Latvia
		1,193	208	3,215	218	586												Lithuania
		5,185	8	117	19	50			33	13,816	1	593			12	5,274		Malta, Gozo and Cyprus Isl.
		436,472	10,957	283,730	6,975	25,231	145	5,475	3	1,311	60	40,259	26	27,841			586	Netherlands
		69,435	10,524	221,414	8,644	22,986	293	19,231	34	13,180	60	45,647	16	19,740			1	Norway
		4,178	801	14,166	277	734	10	181									80	Poland and Danzig
		77,918	3,434	56,440	3,197	9,106	4	162					5	7,999				Portugal
		34,309	883	20,977	791	3,420			149	62,241	25	16,464	16	21,692	132	38,573		Rumania
		21,124	780	22,243	2,576	9,674	10	1,136									102	Russia
		545,076	18,306	349,943	14,154	47,288	1,701	64,393	16	7,053			71	114,987	20	9,345	116	Spain
1	$1,246	393,437	21,269	464,288	13,972	41,176	214	14,531	14	6,860	48	33,273	44	52,071			254	Sweden
		50,445	7,463	214,819	5,715	25,702	422	19,519	1	490	1	580					65	Switzerland
		26,203	384	4,923	286	651	21	865	10	4,181	3	2,768	10	13,736	12	5,134	13	Turkey
3	5,828	2,125,771	71,139	1,248,927	35,712	90,463	9,014	274,252	7	2,915	530	436,038	401	525,444	1,013	197,108	316,266	United Kingdom
		209,598	2,569	23,439	2,641	5,609											15,649	Irish Free State
		4,449	1,307	23,560	563	1,853	40	1,099	67	27,966	8	6,495	9	13,820	2	878	103	Yugoslavia
									50	11,083	2	1,200	7	11,633	3	158	296,099	United States
		4,639	82	1,156	115	321									1	292	308	British Honduras
4	8,499	18,273,102	7,402	135,717	9,466	28,306	524	18,693										Canada
		21,089	863	21,826	785	3,219	67	2,374	15	6,038	22	18,561	1	1,186	49	21,289	82	Costa Rica
		70,148	2,003	52,052	2,312	9,825	16	945	4	1,684	3	2,463	22	26,722	10	4,387	101	Guatemala
		15,222	916	18,425	528	2,099	95	6,897									16	Honduras
		9,047	341	7,744	479	1,506	22	1,071									64	Nicaragua
		91,353	6,034	130,671	7,099	23,166	178	5,644			6	5,609	17	20,648			216	Panama
		50,393	1,768	43,372	2,912	16,661	120	8,822	8	3,316			6	7,296	4	1,755		Salvador
10	6,779	847,665	36,570	537,899	34,309	82,997	1,025	37,903			12	10,261	6	7,388			52	Mexico
			4	44													982	Miquelon
		12,978	1,140	16,532	1,240	3,629	4	337	24	8,294	1	678	5	5,598	11	3,710	2,657	Newfoundland
		24,798	199	3,357	221	585	20	466	26	8,742	9	7,308	1	1,121	2	644	184	Barbados
		88,437	228	4,184	193	602	160	4,439	58	24,982	11	8,530			10	4,388	424	Jamaica
		30,685	392	8,573	282	1,161	62	2,332	29	11,239	20	16,008	1	1,111	48	18,058	31	Trinidad and Tobago
		35,887	619	8,798	598	1,893	56	1,648	11	4,596	9	7,354			7	2,443	249	Other British West Indies
		500,764	56,582	704,675	36,989	80,936	3,989	153,302			18	16,058	25	32,148			909	Cuba
		95,449	3,156	44,370	2,838	8,516	369	13,354	5	2,114	4	3,472	3	3,656			162	Dominican Republic
		14,973	1,047	18,699	1,674	5,069	7	141	8	3,097			1	1,315	11	4,844	10	Dutch West Indies
		6,765	541	11,579	288	1,296	24	653	7	2,832					1	455		French West Indies
		47,424	1,176	33,045	1,845	6,191	17	327	50	20,009	4	2,628	3	3,623	18	7,901	100	Haiti
		5,919	120	1,482	133	493	23	1,063			28	18,886						Virgin Islands
		3,753,428	106,206	1,588,083	108,310	270,392	6,410	219,112	375	142,516	299	904,780	64	88,699			662,112	Argentina
		34,409	489	13,707	612	2,787	10	317	1	402	1	510	18	21,822	92	42,127		Bolivia
		1,889,467	32,273	401,133	27,168	57,414	2,854	70,182	141	49,808	197	157,318	77	98,091			332,303	Brazil
		613,730	9,538	198,376	10,501	27,800	463	29,807	47	19,428	13	10,178	8	10,232	35	15,489	2,481	Chile
		331,043	8,579	216,399	9,903	41,493	356	20,833	46	19,610	41	34,425	89	114,258	115	51,862	1,340	Colombia
		20,632	1,306	27,663	1,973	6,730	46	2,058					15	18,931	30	12,945	89	Ecuador
																		Falkland Islands
		7,879	94	1,728	20	57	14	507	63	21,783	6	4,680			16	4,792	886	British Guiana
		1,643	12	219	12	31	4	79										French Guiana
		1,140	54	636	108	215	2	40	1	438							143	Dutch Guiana
		6,223	28	1,100	101	227			18	7,926	7	6,391	1	1,263	4	1,755		Paraguay
		301,320	5,834	170,208	6,693	29,798	235	12,834	7	3,017	2	1,542	6	7,835	60	27,723	25	Peru
		234,886	15,146	242,519	15,998	33,781	710	37,094	132	51,954	86	56,274	38	51,897	30	14,296	692	Uruguay
		252,219	10,083	241,054	11,463	42,493	212	12,028	203	82,320	31	23,570	11	13,361	272	142,677		Venezuela
		2,699	342	4,604	516	1,253	6	187	34	10,324					24	7,964	4,099	Aden
		516,559	9,470	160,856	3,144	9,200	1,668	52,607	3,203	1,155,723	371	253,836	40	50,151	2,082	755,107	203,291	British India
		83,645	2,798	67,011	1,393	4,997	878	36,850	394	151,773	73	54,995	12	14,868	251	81,260	42,010	Ceylon
		284,812	7,527	106,234	1,518	3,941	1,245	32,428	2,072	730,227	110	96,227	12	15,768	900	314,219	133,100	Straits Settlements
1	2,500	180,832	9,449	153,917	8,377	21,760	486	16,184	144	61,382	82	61,841	65	97,708	58	25,462	2,320	China
		197,464	14,499	228,337	5,757	16,469	1,042	46,407	2,330	813,586	215	156,336	40	52,109	1,079	366,277	134,285	Java and Madura
		74,442	2,034	27,362	1,525	4,260	111	4,884										Other Dutch East Indies
		2,300	40	933	24	154	12	462										French Indo China
		26,181	2,594	42,295	2,241	8,037	294	12,181	89	35,830	16	12,651	21	27,748	21	8,282	220	Hejaz, Arabia and Iraq
		22,490	148	2,861	261	749	32	1,137	3	1,292	6	5,622					195	Hongkong
		1,608,455	37,321	473,167	28,341	67,015	6,682	147,270	201	79,191	64	46,104	44	57,502	72	31,410	5,063	Japan
		9,410	65	644	70	141												Kwangtung
		72,975	2,048	52,867	1,393	5,615	4	438	83	33,779	8	7,090			8	3,593	75	Palestine and Syria
		11,542	805	22,456	979	4,935			7	2,858								Persia
		281,102	24,460	402,779	17,554	52,790	3,683	130,018										Philippine Islands
		12,574	326	4,263	154	406	50	1,058	76	27,256					236	81,233	29,912	Siam
		8,590	58	1,271	170	417												Turkey
		134	19	337	7	17												Other Asia
11	30,614	1,814,821	33,254	883,340	19,479	61,296	5,470	292,419	5,513	1,494,657	496	217,462	22	31,920	3,040	967,598	285,927	Australia
		613,423	9,961	237,853	6,272	23,387	2,144	96,779	2,516	935,267	1,104	837,015	200	236,142	583	209,780	194,851	New Zealand
1	1,200	11,955	238	4,721	374	1,144	153	3,018	16	5,732	1	903	1	1,222	17	5,696	5,133	British Oceania
		4,613	297	5,216	279	840	52	2,475										French Oceania
									54	19,201	6	4,189	2	2,517	18	6,718	6,536	Other Oceania
		38,278							4	1,368					4	1,755		Belgian Congo
		91,555	438	9,015	126	380			135	46,177	33	20,656	4	3,439	154	46,425	47,735	British West Africa
		653,545	10,183	145,347	4,824	14,284	478	17,106	2,297	817,174	51	35,775	6	10,568	384	129,493	90,025	British South Africa
		95,273	1,662	36,144	1,095	3,312	74	1,443	261	97,562	36	29,977	3	5,317	155	62,964	37,015	British East Africa
		48,165	1,877	36,525	1,708	4,570	247	12,418	12	5,314	9	6,137	2	2,593	37	15,050		Canary Islands
		66,486	1,850	31,603	2,709	7,374	473	19,949	12	5,002	14	10,985	6	7,206	12	5,266	265	Egypt
		3,027	101	1,821	81	254	14	601										Algeria and Tunis
		61,138	6	176	6	33			2	812	2	1,458			9	2,913	170	Other French Africa
		568																Italian Africa
		2,837	73	977	112	262												Liberia
		80																Madagascar
		66,725	455	30,096	536	4,145			31	12,619	1	594			54	25,012		Morocco
		15,686	123	2,178	64	209												Portuguese East Africa
		22,105	164	3,392	300	880			25	9,676	1	678			25	11,442	1,046	Other Portuguese Africa
		13,068	134	2,376	81	212												Spanish Africa
31	$56,666	$46,739,182	732,324	$13,081,467	582,116	$1,660,716	56,526	$2,047,642	21,223	$7,235,500	4,411	$3,853,503	1,567	$2,045,604	11,271	$3,815,612	$3,247,407	Total

Bagnulo Builds New Oil Engine With Mechanical Fuel Injection

Former model developed by Italian engineer discarded. Test of present design made for French military representatives. Cylinder block and crankcase upper half cast of aluminum.

SOME years ago a new engine burning heavy fuels and operating on the hot bulb principle attracted considerable interest in Central Europe. It was the invention of an Italian engineer, Sig. Bagnulo, and the German patents were acquired and developed by the German General Electric Company. In the majority of the hot bulb engines the bulb is formed on the cylinder head, but in the Bagnulo engine it was located at the side of the vertical cylinder in an inverted position, with a needle-type fuel metering valve above it. The engine operated on the four-stroke cycle, and during the suction stroke air was drawn into the cylinder through an air valve in the cylinder head, while the simultaneous rarefaction of the gases in the hot bulb caused fuel to be drawn into it. As the hot bulb was filled with dead gases the fuel could not burn, but during the compression stroke air was forced into the hot bulb, and, consequently, a combustible mixture was formed which was ignited by the heat of the walls together with the heat of compression.

Although the early reports about this engine were quite optimistic, it has now been discarded by the inventor, who instead has developed an engine with mechanical fuel injection. It appears that the early experiments were made with a single cylinder engine, and when it was attempted to apply the principle to a four-cylinder, difficulties were encountered by reason of thermal instability due to unequal distribution to the different cylinders.



Pump and distributor unit of Bagnulo heavy oil engine

An engine of the new design is reported to have gone through a 50-hour test in France in the presence of "high personalities of the Artillery and the Air Service." From the phraseology it would appear that the test was not an official one. The engine tested was a two-cylinder one of 100 mm. bore by 120 mm. stroke (3.94 by 4.73 in.). It had valves in the cylinder head and was provided with pressure lubrication. Using gas oil of a specific gravity of 0.87, the engine developed substantially 10 hp. at 1200 r.p.m., with a fuel consumption of 222 grams (0.49 lb.) per horsepower-hour. The compression ratio was 6.8.

It appears that Bagnulo has built two, four and six-cylinder engines, all with the same cylinder dimensions. His standard compression ratio is 8:1 and the normal speed 1400 r.p.m. Aside from the fact that the cylinder block and crankcase upper half are cast of aluminum, there is nothing out of the ordinary in the design of the engine proper. The weight of the two-cylinder engine which underwent the 50-hour test is given as 352 lb., which, with an output of 10 hp., makes the specific weight about 35 lb. p. hp. With the higher compression and at the higher speed the output of course is greater, thus bringing down the specific weight. In fact, the four cylinder 3.94 by 4.75 in. engine has a rating of 40 hp. Cast iron liners are inserted into the aluminum cylinder block. The cylinder head, containing the valves, is of cast iron.

Fuel Inspection Method

The greatest interest attaches to the method of fuel injection employed. With most of the small multi-cylinder Diesel engines a separate pump barrel is provided for each cylinder, of a displacement exactly equal to the amount of fuel required by the engine cylinder per cycle. This leads to pumps of exceedingly small dimensions. Bagnulo figures, for instance, that a cylinder of large truck size requires 0.000087 lb. of fuel per cycle, and he does not believe it possible to make these small pumps sufficiently accurately so they will deliver this amount of fuel within plus or minus 25 per cent. Unequal fuel distribution, of course, would entail irregular running and more or less uneconomical operation.

The principle used by Bagnulo consists in putting the fuel under a constant, moderate pressure by means of a plunger pump, regulating the rate of delivery by means

of a needle valve in the fuel line, and connecting the fuel line to the different cylinders successively by means of a distributor operated from the camshaft.

A sectional view of the fuel pump and distributor is shown herewith. As already pointed out, the engine possesses an overhead camshaft, enclosed by a housing on top of the cylinder head. To the rear end of this housing is flange-bolted the pump-distributor unit, the shaft of this unit being driven from the camshaft through an Oldham coupling. A cross shaft is driven from this shaft through a pair of helical gears and carries eccentrics for operating the plunger pump. The latter is provided with conical valves—a single inlet valve at the side of each barrel and two delivery valves in tandem below it. The pump is of the triple plunger type, which has no dead points and gives a substantially constant pressure, and it runs at only about one-tenth engine speed. It puts the fuel oil under a pressure of about 150 lb. p. sq. in. A relief valve connects the delivery side to the suction side as soon as this pressure is exceeded. Only a small quantity of fuel is kept under pressure, and the required pressure is therefore attained very soon after the engine is started.

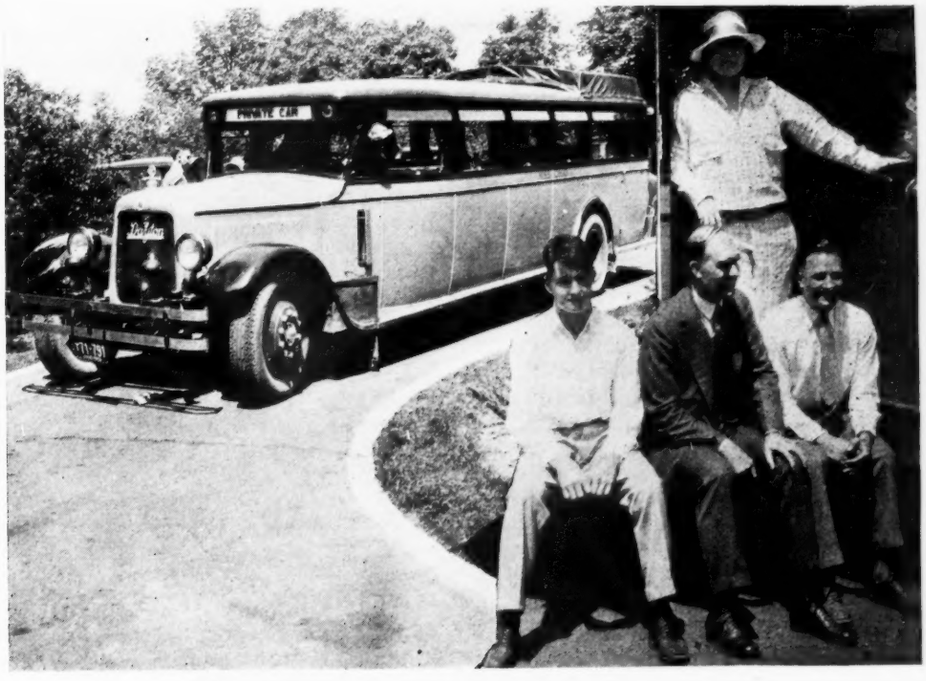
From the delivery side of the pump the fuel flows through an outside tube to the distributor. Entering the distributor housing it passes through a regulating needle valve or control valve. The distributor consists of a number of radially disposed conical valves, one for each engine cylinder, which are operated by a single cam on the distributor shaft. From each distributor valve a tube leads to the injection nozzle of the corresponding cylinder, which is secured to the cylinder head. The fuel is injected into the combustion chamber before the end of the compression stroke through an ordinary spray nozzle.

Electric Igniter Used

In starting and when running under small load, use is made of an electric igniter. In the sectional drawings which have been published of the engine this is shown to consist of a conical coil which is heated to a high temperature by current from a storage battery. According to a later scheme, a form of plug is used in which the current is compelled to flow through a stack of washers of different metals between which there is poor electric contact. Each ignition plug takes about 200 watts at 6 volts, and the engine is said to be ready for starting from cold after 40 seconds. Starting is effected by means of an electric motor driving the flywheel through a Bendix drive.

Nothing is said in the description which has reached us about the means for controlling the speed of the engine, nor about a governor.

C. F. Kettering "Vacationing" in a Bus



The Kettering party and the bus it is traveling in

A 10,000-mile trip in a specially equipped bus is the way C. F. Kettering, vice-president of General Motors Corp. in charge of research, chooses to spend his vacation this year. He is traveling to the Pacific Coast and back in a Model Y, 6½-ton Yellow Coach which has been christened "Miss Ohio." The coach has a special Delco ignition, starting and lighting system and the equipment includes movable reclining chairs, folding cots, center pole tent, a Frigidaire, a Day-Fan radio, a phonograph, kitchen utensils, compartments for personal effects and a ten-gallon tank of water under the hood where it can be heated for toilet purposes. Four of those in his party are shown in the group above. Left to right they are, Eugene Kettering, Mr. Kettering, Adam Schantz and Mrs. Kettering.

American Capital Builds German Roads and Helps Open New Markets

Road construction in Germany is progressing as rapidly as capital can be obtained. About 185,000 miles are now in use. Much interest in the subject.

WITH American financial help the German government—national and municipal—is undertaking a highway development campaign which will probably amplify the present market for small American trucks as well as for especially designed road building machinery, according to a recent bulletin from the Transportation Division, Department of Commerce.

Although German roads have been developed beyond the average for Europe their primary function was military rather than commercial. Nearly all of the country is level and is traversed by innumerable canals which afforded adequate transportation facilities for the Germans, particularly since they are not at all affected by the American desire for speed.

Since 1914 practically no maintenance work has been performed on roads which did not have a military value with the result that the present system is considerably less complete than it was then. During the past year or two more attention has been given to highways and a large share of the many millions of dollars which have been loaned to German municipalities by this country has been used for construction of roads.

Most of the roads are of water bound macadam, for the construction of which the country is well provided with hard, wear-resisting rock formations. In the cities granite block paving is frequently found as well as asphalt and tar roads. Concrete roads have not met with much favor as yet, mainly because of the lack of contracting concerns experienced in this type of construction.

185,000 Miles of Highways

At the present time there are about 37,000 miles of first class roads in Germany; about 75,000 miles of second class roads; 50,000 miles of good streets and 25.000 miles of second class streets in cities, towns and villages. Thus there is a total of about 185,000 miles of highways on which motor vehicles can be operated the year around.

So far motor vehicles are being used almost entirely for utilitarian purposes, it being estimated that 80 per cent of the automobiles in use are for the purpose of transporting goods and passengers to and from railway stations within a radius of about 20 miles. Over half of the total traffic on the roads is still moved by draft animals, which offers a good idea of the future possibilities of this market for motor vehicles.

Construction of roads at present are made difficult by the shortage of liquid funds. The depression which overtook German finances last year as a result of re-establishment of normal conditions after the war inflation has left relatively few business groups with any ready cash. As mentioned before, much of the work which has been done during the last year was carried on by various municipalities and was financed by loans floated in the United States.

Road building has, in general, been more prosperous than the average German industry and because of the awakened interest in the subject it is likely to continue to be semi-prosperous. Various methods for raising funds for highway construction are being considered by the National government and by the various cities. Taxation of motor vehicles has furnished a considerable share of maintenance costs in the past while new construction by the government has been met by appropriations.

German Car Market

Because of the extremely high tariff imposed upon motor vehicles, which is not likely to be lowered to any great extent until the German industry gets on its feet again, there will be a rather small market for American made vehicles even after extensive road development. Personal automotive transportation seems not particularly desirable to the bulk of the German population so that the passenger car market at present is limited without tariff restrictions. There is likely to be a market for small American-built trucks but heavy trucks will be practically eliminated because of the tariff.

In northern Germany the roads are generally level dirt roads, but in southern Germany the topography requires many steep grades and curves. Traffic of course, is greatest around the industrial centers such as the Rhineland and Ruhr area, Upper-Selesia, Saxony and the territory tributary to Berlin, but in none of these districts has there been developed motor vehicle transportation facilities comparable to those of the United States.

Among the movements instigated to further road building progress is the formation of the Studiengesellschaft fur Automovil-Strassenbau, an association organized for the purpose of propagating good roads. The Advisory Council to the Reichstag is now considering plans for raising money to repair and maintain about 25,000 miles of the principal German highways. It is estimated that from 65 to 75 million dollars are required each year to maintain the highways now existing.

IN a French publication are given statistics regarding the numbers of different models placed on the market by various prominent French manufacturers between 1919 and 1925. Renault leads with 34 models, and is followed by Peugeot with 25, Mathis with 23, De Dion with 22, Chenard with 19, Panhard with 18, Unic with 14, Berliet with 13, Delaunay with 12 and Rochet with 11. During this same period the Italian Fiat firm (with which the French makers must compete) placed only seven new models on the market, while Ford sold one and the same model throughout the period.

EDITORIAL

Automobile Price Per Pound

IF automobiles were buttter and if it were customary to buy them by the pound, Mr. Public might walk into the dealer's establishment and say, "Give me a pound of automobile." In which case the dealer would reply, "Sixty cents, please," in case it was a pound of the lowest priced 4-5 passenger closed model the customer desired. The cost of a pound of coupe or sedan today would be a little over 68 cents, while the cost of a pound of open car would be slightly above 69 cents.

That means that automobiles today cost less per pound than does good butter in the winter time. And they cost less per pound than they did a few years ago—at least the closed models do and this is the predominating type. A compilation just made shows that in 1923 American built coupes and sedans sold at retail for an average of 76.3 cents per pound while at the end of 1925 the average was 68.2 cents per pound. The lowest priced 4-5 passenger closed cars cost 73.2 cents per pound in 1923 and 60.2 cents per pound at the end of last year. The only increase has been in open lines which averaged 64.2 cents per pound in 1923 and which were 69.1 cents per pound when this year began.

While the delicacy and complexity of the motor vehicle makes its value less properly judged on a pound basis than that of many other articles of merchandise, it is interesting to note that while the trend has been toward weight reduction in the last few years, prices have been dropped to so great an extent that the price per pound has decreased materially. Just another evidence of the value that the public gets in buying present day motor transportation.

Thinning Out the Names

THE recent announcement that all the cars of the Chandler-Cleveland Motors Corp. would appear hereafter under the Chandler name emphasizes a movement in the industry which has been taking shape for some time. There has been a definite tendency for several years to consolidate various types of cars under a single name-plate when these cars became a part of the same factory organization. The Maxwell name passed out shortly after becoming a part of the Chrysler line, the Ajax became a Nash light six after its first year of existence. Numerous other companies have marketed cars in several price classes under the same name-plate for a long while.

The chief exception to this apparent trend is the policy thus far pursued by General Motors Corp. which not only has refrained from consolidating any two of its lines under a single name, but which, in bringing out the new Pontiac some months ago, gave a separate name to the new product instead of beginning to merchandise it under the name-plate of one of its already existing lines.

From an advertising and merchandising standpoint, each policy as regards names has certain very distinct advantages. Whether name alone is of major importance in determining merchandising success is open to question, of course, but that it has some reasonably material bearing seems likely.

Factors of Safety

THERE has been a tendency in recent years to base the factor of safety in engineering calculations on the elastic limit of the material rather than on its tensile strength, as has been the general custom in the past. The argument in favor of using the elastic limit is that if the stress exceeds this figure periodically, the part is bound to fail in time, and the object therefore should be to keep the maximum stress below the elastic limit. This, of course, means that the working stress must bear some relation to the elastic limit.

There are, however, serious objections to the use of the elastic limit in determining the working stress. One of these is that it is an ill-defined property and cannot be determined with any degree of accuracy. A more weighty reason, however, for the retention of the tensile strength is the discovery, by several investigators on the fatigue of metals, that the property which they call the fatigue limit, that is, the maximum stress which a metal will withstand during ten million cycles without failure, is much more nearly proportional to the tensile strength than to the calculations on the tensile strength may therefore well persist in it. Among other organizations which have never recognized the elastic limit in specifications for materials is Lloyds Bureau of Ship Registry.

Fitting the Truck to the Job

THE strenuous attempts of bus and truck factories to get their products sold in the places where they can function most efficiently is one factor which is having a stabilizing effect on the commercial vehicle industry. Plenty of these units still are sold, to be sure, without sufficient advance study to determine the full transportation economics of the task which they are to perform, but the educational work which has been going on for several years is beginning to bear fruit.

"Forego a sale if the equipment does not fit the needs," the executive of a prominent truck factory urged his field representatives not long ago. And more than one factory has found the policy to be a sound one, even though difficult of practical realization.

AUTOMOTIVE NEWS SECTION INDUSTRIES

Philadelphia, Pennsylvania

Thursday, August 12, 1926

Production Resumes Upswing As Fall Buying Season Nears

PHILADELPHIA, Aug. 12—The automobile manufacturers that recently brought out lines of new models are swinging into fairly heavy production, and the industry as a whole is well above the average of midsummer activity. All reports tend to indicate that the new cars are being received with the expected degree of enthusiasm, while most of the companies that follow the policy of no yearly models are continuing on a satisfactory basis.

The summer is passing without the heavy slump in sales that was predicted several months ago by those of a pessimistic turn of mind. The manner in which the market has held up throughout the year has been a source of amazement to everyone connected with the industry, for it has been without precedent.

It is customary, furthermore, for the fall months to show a material sales gain over the summer, and if this normal course is followed this year, then it will indeed be by far the best the industry has ever seen.

There are one or two factors that are slightly different this year. Stocks in the hands of retailers to all indications are somewhat above normal, and while this will not directly affect the market, it may influence fall manufacturing. Again, the manufacture and sale of closed cars has been proceeding at a record-breaking rate, almost without the usual swing to open cars in the warm weather, and it remains to be seen whether the fall business will be affected by this concentration on the all-season models—running to over 80 per cent for all manufacturers except Ford.

Trade in 7 States Holds 1926 Will be Best Year

CHARLOTTE, N. C., Aug. 11—Twenty-five hundred miles of travel by motor car through seven states and the District of Columbia and not a complaint was heard regarding automotive trade conditions.

Conditions concerning the automobile distributors and dealers, the tire concerns, the jobbers and dealers and the garagemen uniformly were reported to be sound, with business brisk in nearly all lines.

It is true that, generally, the automotive trade was in a seasonal slump, when current volumes are compared with those of the spring months in which the peak of the year's business is done. This was not unexpected in any city, and almost everywhere an opinion was obtained the correspondent was told substantially that "this should be our best year."

The tour included the States of South Carolina, North Carolina, Virginia, West Virginia, Ohio, Pennsylvania, Maryland and the District of Columbia.

Canada Crops Gain $264,890,000 in 1925

OTTAWA, Aug. 12—Definitely improved agricultural conditions in Canada, resulting this year in a large upturn in automobile purchasing, is indicated in the estimate submitted by the Canadian Government Bureau of Statistics.

According to the estimate the total agricultural revenue of the Dominion last year was $1,708,567,000 an increase of $264,890,000 over the previous year. The gross agricultural wealth of Canada at the end of 1925 was fixed at $7,832,942,000, an increase of $324,685,000 over 1924.

The report shows the average yield of wheat per acre in Canada as 15.2 bushels for the ten years 1916/25. Wheat in 1925 sold at an average price of $1.12 a bushel. The total crop was 416,849,700 bushels from 21,972,732 acres, the second largest crop on record.

General Motors Pays 50% Stock Dividend

NEW YORK, Aug. 12—The board of directors of General Motors Corp. today declared a 50 per cent stock dividend on the common stock of the corporation and in addition a regular dividend of $1.75 per share on the common stock, including the stock to be issued as a dividend, all payable Sept. 11, 1926, to stockholders of record at the close of business Aug. 21.

The directors also declared the usual quarterly dividend of $1.75 on the 7 per cent preferred and $1.50 on the 6 per cent preferred and 6 per cent debenture stock, payable on Nov. 1, 1926, to stockholders of record, Oct. 4, 1926.

Form General Aircraft

DETROIT, Aug. 12—Organization of the General Aircraft Corp. to manufacture airplanes and airplane motors has been completed here by C. C. Jones. Mr. Jones is reported backed by private capital.

GASOLINE PRICES 15 CENTS TO $1.29

WASHINGTON, Aug. 12—How much does gasoline cost?

The answer, according to a world-wide gasoline price survey, just concluded by the Department of Commerce, is of particular interest to the twenty odd million motorists of the United States—principal users of this automotive necessity.

The lowest price found was 15 cents a gallon at Bucharest, Rumania; the highest price $1.29 a gallon at Teheran, Persia. Many factors, of course, enter into the calculation such as distance from source of supply, quantity consumed, transportation costs, import duties, excise taxes, distribution and marketing costs, etc.

Prices from the major centers of the world are as follows: Buenos Aires, 40 cents; Sydney, 44; Vienna, 30; Antwerp, 27; Rio de Janeiro, 44; Johannesburg, 60; La Paz, Bolivia, 65; Montreal, 25; Santiago, Chile, 37; Shanghai, 42; Havana, 33; Warsaw, 43; Paris, 28; Athens, Greece, 62; Berlin, 39; Rome, 43; United Kingdom, 24; Yugoslavia, 66.

Diamond State May Sell Fiber Part of Business

PHILADELPHIA, Aug. 12—Negotiations are under way for the sale of the fiber part of the business of the Diamond State Fiber Co. of Bridgeport, Pa., according to a statement by John N. Taylor, president and general manager. Only the fiber part of the business would be sold if the negotiations are completed.

Under plans of the company, the fiber and celoron divisions of the company will be separated and operated as separate units in the event that the sale negotiations are carried through. These are reported progressing by Mr. Taylor.

A. H. Schiappacasse

DETROIT, Aug. 11—Following a protracted illness, A. H. Schiappacasse, lately director of used car sales of Dodge Brothers, Inc., died here at the Harper Hospital, Monday. Burial was Wednesday.

Mr. Schiappacasse entered Dodge Brothers employ as a draftsman and became assistant to the director of service prior to becoming affiliated with the Lincoln Motor Car Co. in 1919. In 1922 he returned to Dodge Brothers and represented that concern in the field until he was returned to the home office in his last connection in April, 1925.

Make Plans to Show Equipment Operating

Public Exhibition to Illustrate to Car Owners Advantages of Modern Shop

NEW YORK, Aug. 11—Plans have been worked out by the Service Equipment Committee of the Motor & Accessory Manufacturers Association and approved by Sam Miles, for the service equipment exhibits that will be an important part of the national automobile shows in New York and Chicago sponsored by the National Automobile Chamber of Commerce.

Discussing these plans, Neal G. Adair, manager of the Show and Educational Departments of the M. & A. M. A., declared that the equipment exhibit in connection with the New York show would be located on the fourth floor of the Grand Central Palace.

Each day until a late afternoon hour, it is the plan to close the exhibit to the general public so that exhibitors may deal only with the trade during that time. Then in the evening, partly because the exhibitors want the public to get the idea of a modern service equipment and so exert an influence on service station operators to put it in, and partly, also, because of fire regulations, the exhibit will be open to the public.

At Chicago the gallery of the new North Hall will be used. This will afford good exhibit space and make possible the segregation of the show.

Realizing that a working exhibit attracts greater attention, it is the plan at both national shows to provide power and, if necessary, drainage for washing machines and whatever is needed so that the service equipment can be shown in operation.

Arrangements will be made for the necessary constructive placards to show what the exhibits are all about. It is possible that each show will have a facsimile ideal service station, something built out of metal or papiermache, not having any particular products but showing what a shop should have and where it should be placed.

Service equipment makers are reported showing a good deal of interest, so that in both shows it will be a question of getting the exhibitors in and accommodating them.

Flint Removal Plans Set

FLINT, Aug. 11—R. H. Mulch, vice-president and general manager of the Flint Motor Car Co., states that the last Flint car to be made in the plant here will be turned out Saturday of this week, and that the plant will be vacated completely in the very near future.

Hanch Sets Meeting Date

CHICAGO, Aug. 12—The annual convention of the National Association of Finance Companies will be held Nov. 15 and 16 at the new Palmer House, Chicago, it was announced today by C. C. Hanch, general manager. A meeting of the directors will be held there the evening of Nov. 14. The program has not yet been completed. All members have been requested to suggest topics they would like to have discussed or acted upon.

87 Malleable Firms to Pay $2500 Fine

WASHINGTON, Aug. 12—The Department of Justice announces here that the case of the Government against the American Malleable Castings Association has been brought to a close at Cleveland by the imposition of fines aggregating $217,500 on 87 defendants indicted under the Sherman Anti-Trust law. The defendants entered pleas of "nolo contendere" before Judge Westenhaver in the U. S. District Court for the Northern District of Ohio. Each defendent was fined $2500.

67″ Chenard Walcker Wins San Sebastian Road Race

SAN SEBASTIAN, July 25 (*by mail*)—A 67 cu. in. Chenard Walcker, driven by Leonard and Manso, beat all comers in the 12 hour touring car road race just held here. The little car covered 773.8 miles, thus averaging 64.48 miles an hour.

The event was run on a time and weight handicap basis, the smallest cars being given the full twelve hours and the others being started later according to their piston displacement. In addition the international racing rules were applied fixing a minimum car weight and a minimum passenger load according to the size of the engine. Under these rules the 233 cu. in. sleeve valve Peugeots had a total weight of nearly 6000 lb., and the 381 in. supercharged Mercedes cars scaled 6600 lb.

The winning Chenard Walcker was distinctive in having a flatiron type of body with front and rear wheels recessed. The engine is a four-cylinder with a two-bearing crankshaft and valves in the head operated by pushrods and rockers. About a year ago this engine, which is a standard job, was modified by Engineer Toute to receive an auxiliary rotary exhaust valve at the bottom of the piston stroke. This gave very good results and for the San Sebastian race a Cosette supercharger was added. The car lapped at 75 miles an hour and covered 72.6 miles in the second hour; when it was seen that there was no serious competition the speed was reduced. A similar Chenard Walcker, without a supercharger, covered 763.8 miles in twelve hours.

Stutz Continues Pace

INDIANAPOLIS, Aug. 12—Capacity operation of the Stutz factories is continuing through the summer months and the company reports orders still several months in advance.

Business in Brief

Written exclusively for* AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.

NEW YORK, Aug. 12—Signs of moderate revival in trade and industry continued to appear last week. Among the basic industries, the best showing was made by iron and steel and cotton textiles. Stock prices continued to advance, while commodity prices declined to a new low level for the year.

The official report based on condition Aug. 1 indicates a cotton crop of 15,621,000 bales. This is 253,000 bales larger than the forecast two weeks earlier.

Building contracts awarded last month in 37 States, according to the F. W. Dodge Corp., amounted to $518,931,900. This total is about 5 per cent lower than that of June, and compares similarly with that of a year ago.

CAR LOADINGS

Car loadings reached a new high level for the year during the week ended July 24, when the total was 1,085,450 cars, as against 1,083,626 a week earlier and 1,033,519 in the corresponding period last year. Net operating income of class 1 railroads in June amounted to $107,335,654, representing an annual return of 5.49 per cent on property investment, as against 4.82 per cent in June, 1925. Net income for the first half of the year was at the annual rate of 4.94 per cent, as against 4.49 per cent a year earlier.

BANK DEBITS

Bank debits to individual accounts reported to the Federal Reserve Board for the week ended Aug. 4 were 18.3 per cent above the total for the preceding week and 13.3 per cent above that for the corresponding period last year.

FISHER'S INDEX

Fisher's index of wholesale commodity prices stood at 147.7 last week, as against 148 in the preceding week and 150.8 four weeks earlier.

FEDERAL RESERVE STATEMENT

Bills and securities held by the Federal Reserve Banks increased $43,200,000 during the week ended Aug. 4, with gains of $26,200,000 in discounts, $17,300,000 in open market purchases and $1,000,000 in Government securities. Note circulation rose $6,800,000 and deposits $8,200,000, while reserves decreased $22,600,000. The reserve ratio declined from 76.3 to 75.4 per cent.

During the same period, loans of reporting member banks increased $99,000,000, investments $4,000,000, borrowings from the Federal Reserve Banks $31,000,000 and net demand deposits $51,000,000. Loans secured by stocks and bonds to brokers and dealers by member banks in New York City increased $87,000,000.

Money rates were substantially unchanged last week, call loans continuing at 4 to 5 per cent, time loans at 4½ to 4¾ per cent and commercial paper at 4 to 4½ per cent.

Timken Offer Waits Bock Stock Action

Meeting This Week to Sanction Proposed Sale of Important Bearing Unit

CANTON, Aug. 9—The Timken Roller Bearing Co. has arranged to purchase the Bock Bearing Co., of Toledo, at a price approximating $1,500,000. Before the deal is closed the Bock company stockholders will vote on the proposition and it is understood a special meeting is called for Aug. 16 for this purpose.

The Timken Roller Bearing Co., the largest manufacturer of bearings in the country, has plants in Canton and Columbus, Walkerville, Ont.; Birmingham, England, and Paris. In May last year it acquired the assets of the Gilliam Mfg. Co.

Directors of Bock Bearing comprise R. E. Clingas, president and general manager; W. S. Quinlan, vice-president; M. H. Murch, F. F. Prentiss, John A. Kling, Sterling Newell, W. E. Bock, G. E. Randeles and R. B. Wallace.

In 1917 the common stock was sold to the Standard Parts Co., the preferred shares being retained. When the Standard Parts blew up the Cleveland interests repurchased the common stock, reorganized the company and have been operating it under the active management of Mr. Clingas.

The present capital structure of the Bock concern consists of $400,000 7 per cent bonds and $337,200 7 per cent preferred stock and 10,300 shares of no par common stock.

To Add $250,000 Building to Fisher-Janesville Unit

MILWAUKEE, Aug. 7—Walter W. Oeflein, of Milwaukee, has been awarded the general contract for the construction of a $250,000 addition to the Janesville factory of the Fisher Body Corp., whereby the Janesville plant of Chevrolet gains a material increase in capacity. The new Janesville building will be 150 by 602 feet, fireproof, with a loading dock the full length, served by a siding extension of 600 feet. General offices are provided for in the new building and will be 150 by 26 feet. The present Duco room will be devoted to manufacturing and a new Duco department five times as large installed in the new building. Ellery L. Wright is branch manager at Janesville.

Indian Shows New Line

SPRINGFIELD, MASS., Aug. 9—Announcement of 1927 models of the Indian Prince, Scout and Big Chief have been made by the Indian Motorcycle Co. Prices remain the same as before, although numerous changes and improvements have been made to give better riding qualities, lubrication and protection to the rider.

The major changes made include larger and wider mud-guards on the Prince and Scout, lower saddles and improved saddle suspension on all models, adoption of Drain-oil piston rings on all models, larger camshafts and camshaft bearings on the Prince and Scout, Alemite lubrication on all models, a new type multiple disk clutch on the Prince as well as 250 per cent increase in braking area on this model.

Australian Combine Formed to Build Car

WASHINGTON, Aug. 12—Amalgamation of eight engineering and electrical equipment manufacturing firms in New South Wales for the purpose of forming a company with the object of producing an Australian motor car on the system of mass production and of a six-cylinder type, especially suited to Australian conditions is announced by the Automotive Division of the Commerce Department following receipt of consular dispatches from Australia.

The new company, which is to be called the National Motor Car Mfg. Co., Ltd., is in process of flotation and its capital is stated to be £1,000,000, though the companies cooperating say they have £3,000,000 to back them. The company guarantees to produce a 100 per cent Australian machine at their plants, and to obtain the raw material locally.

To Test Insurance Act

TRENTON, N. J., Aug. 9—An injunction has been served upon State Motor Vehicle Commissioner Dill restraining him from enforcing provisions of the compulsory liability insurance act, passed by the 1926 legislature, against Drewes Brothers Auto Livery, Inc., Jersey City. The action is in the nature of a test case and a hearing will be held in Jersey City, August 16, to determine whether the injunction should be made permanent.

The immediate effect will be to prevent Commissioner Dill from revoking the registration of the company's cars for failure to comply with the law. The Drewes company rents cars without a driver.

Stanford Gets Aero Fund

NEW YORK, Aug. 9—A gift of $600,000 to Leland Stanford University and the California Institute of Technology were announced here by Harry F. Guggenheim, president of the Daniel Guggenheim Fund for the Promotion of Aeronautics. The gift is similar to the half million dollar grant made last year to establish the Daniel Guggenheim School of Aeronautics in New York University.

Chain Belt to Add Unit

MILWAUKEE, Aug. 9—The Chain Belt Co. has ordered plans for another production unit of its foundry and machine shop group. It will be 120 by 308 feet. The Chain Belt Co. is now working night and day shifts on a full capacity basis.

Shoppers Using Cars to be N.A.C.C. Study

Will Determine Relationship Between Parking Regulations and Retail Buying

NEW YORK, Aug. 9—A series of surveys to determine the relationship between retail trade and parking regulations in various cities and towns throughout the country will be undertaken shortly by the Traffic Planning and Safety Committee of the National Automobile Chamber of Commerce, John C. Long, secretary of that division, said today.

The surveys will assume, on a more nearly national scale, some of the aspects of the investigation proposed by Captain William J. Pedrick, vice-president and general manager of the Fifth Avenue Association, who in published statements accredited to him today refuted previous declarations of the traction interests that automobile custom was of small consequence to the retail establishments of Manhattan and challenged their advocacy of further extension of non-parking areas.

"It has been obvious for some time to the members of this association," Captain Pedrick was quoted, "and to the business interests of downtown Manhattan that their commercial prosperity depends very largely upon private automobile trade. The same fact is indicated in the responses made to a recent nationwide traffic survey made by the Department of Commerce, which showed that almost invariably retail merchants throughout the country testified to the necessity for this parking accommodation, and the average time alloted as being necessary for business purposes was one hour.'"

"The transportation companies have indulged in publicity statements to the effect that the automobile trade is a matter of small consequence to modern retail establishments. In view of those statements it will interest the public to know that some of the largest stores in this city report type of business to run as high as 40 per cent of their total volume, according to the type of merchandise handled."

Hawaii Leading Tire Market

WASHINGTON, Aug. 7 — Statistics just compiled here by the Rubber Division of the Department of Commerce reveal that Hawaii leads Uncle Sam's territorial possessions in the consumption of American tires. During June a total of 37,418 casings, valued at $620,885, were shipped to Hawaii, which also took 30,873 inner tubes worth $92,374 in the same month.

Porto Rico ranks second with 27,855 casings valued at $421,788 and 16,292 inner tubes, valued at $48,369. Alaska's imports of American tires amounted to 1,694 casings, valued at $30,218, and 1,854 inner tubes valued at $6,175.

July Rim Production Runs Ahead of June

Seven Months' Output Declines From 1925—Balloons Make Gains

CLEVELAND, Aug. 9—Rim production still remains below last year's totals, the Tire and Rim Association of America, Inc., reports. During July 2,123,368 rims were inspected, whereas in July of 1925 the total was slightly higher at 2,262,671. The July, 1926, total, however, is a trifle above the June figure of 2,110,035, but under the May total of 2,178,947. Total rims inspected during the first seven months of this year were 15,318,945, as against 15,796,344 in the same period of 1925.

July production totals in principal sizes were as follows:

	July, 1926	July, 1925
Clincher		
30 x 3½	95,810	390,682
Balloon		
28 x 3½	1,009,388	819,685
28 x 4	195,733	318,462
29 x 4	289,227	185,495
30 x 4½	131,282	176,862
30 x 5	27,051	34,716
31 x 5	23,765	28,794
High Press.		
30 x 3½	14,814	46,078
32 x 4	16,369	22,909
32 x 4½	33,224	31,207
Truck "20"		
30 x 5	115,304	79,736
Truck "24"		
34 x 5	11,051	5,305
36 x 6	5,614	4,170

Oakley Becomes Oakite

NEW YORK, Aug. 11—A reorganization with a change in name has been announced by the Oakley Chemical Co., maker of Oakite products for industrial cleaning operations. The firm henceforth will be known as Oakite Products, Inc., a New York corporation with $2,000,000 capital. The personnel of the management and the field organization will remain the same, but it is planned to greatly enlarge the scope of work. General offices continue to be at 22 Thames street.

Buys Grinder Control

MILWAUKEE, Aug. 9—Charles J. Davidson, formerly chief engineer of power plants for the Milwaukee Electric Railway and Light Co. and more recently a consulting engineer in private practice, has acquired the controlling interest in the Gilbert Grinder Co., manufacturing tool grinders in various sizes and general abrasive machines. He has taken charge of the business, being president and general manager.

Auburn Exports Increase

AUBURN, IND., Aug. 9—Exports shipments by Auburn Automobile Co. for July were equal to total export shipments in the first seven months of 1925. The company now has 54 export distributors in 42 countries.

ONLY COMMUTERS RIDING ON TRAINS

HARTFORD, CONN., Aug. 7—That only the commuters now remain and that they bring no profit to the road was the assertion of Carl A. Mitchell, superintendent of the Hartford division of the New York, New Haven and Hartford railroad in a talk before the Civitan club this week. Motor cars are responsible for this condition, Superintendent Mitchell remarked, local passengers now riding in automobiles especially at this season of the year.

The New England Transportation Co. which is a subsidiary of the New Haven road is operating buses all over the state in many cases having bought up privately owned lines.

Thompson Products Doubles Net Profit

CLEVELAND, Aug. 10—Following issuance of the financial statement of Thompson Products, Inc., for the half year, C. E. Thompson, president, indicated continuance of company business at a good level both in original equipment and replacement markets and highly favorable prospects for the balance of the year.

The financial statement showed net profits for the first six months of 1926 were $446,561, or double those of the corresponding period last year. Net sales increased over 75 per cent.

The company's condition is ascribed by President Thompson to large original equipment contracts for one-piece steel valves from car builders who have changed over from other types, and also to a growing practice of jobbers to regard and emphasize engine valves as a major stock item.

Federal Shipments Higher

DETROIT, Aug. 9—Federal Motor Truck Co. shipped 5321 trucks in the first seven months of the year as against 3978 during the first seven months of 1925. July shipments were 680 against 507 in July last year. The company is now building all its own truck cabs and a large part of its bodies. The company is also changing its manufacturing system over to progressive line assembly which will make possible a 50 per cent production increase.

Mexican Sales Dormant

WASHINGTON, Aug. 12—Automotive sales in Mexico have not improved and, in fact, appear to be dropping behind, partly for seasonal reasons and partly on account of the general economic depression, according to a cable just received by the Automotive Division of the Commerce Department. The automobile exhibition has not caused much stir.

New Colors Feature 1927 Chevrolet Line

Mechanical Changes Confined to Details—Same Models and Prices Continue

DETROIT, Aug. 11—More colorful bodies and several minor mechanical changes feature the new 1927 series of cars announced this week as "the Smoothest Chevrolet." While no changes have been made in the body lines, the 1927 cars have a striking appearance due to the harmonious blending of the new Duco colors. Prices are unchanged.

The outstanding mechanical feature of the new Chevrolets is an additional engine support between the clutch and transmission housing. This pressed steel channel member is attached to gusset plates on the frame side rails by two bolts on each side, the arrangement permitting easy removal of the power plant when desired. The function of this member is to absorb torque reaction of the propellor shaft which in turn reduces vibration. It also provides a more substantial support for the power plant and strengthens the chassis frame. Along with this change the universal joints have been redesigned so that the trunnions operate on separate bushings making for longer life and easier service.

Two changes have been made in the engine. The connecting rods have been lightened by changing the I-section slightly and the cam countours have been altered to give quieter valve operation. For the same reason, the radii on the tappets have also been changed.

Spark and throttle controls formerly mounted on the instrument board, are now carried in the center of the steering wheel along with the horn button. A new feature is the method of operating the stoplight. In place of the customary wire spring and switch, the light is operated by a lug on the brake rod which comes in contact with a lever suspended from the fourth frame member. The lever is integral with the switch, the latter being of the non-arcing variety.

A solid rubber battery case with built-in handles is now employed and, instead of being secured by pull-down bolts, it is held more rigidly by a horizontal bolt which clamps the two sides of the battery container to the sides of the battery.

Colors on the new bodies are: sedan, Algerian blue; coach, Thebes gray; landau, Alpine green; coupe, Dundee gray; open models, Biscay green. All cars now have a rear view mirror.

Los Angeles Gets Salon

NEW YORK, Aug. 12—The management of the Automobile Salon announces that three exhibitions will be held this winter. A Los Angeles exhibit will follow the New York and Chicago salons. The dates are: Nov. 24-Dec. 4, New York, Hotel Commodore; Jan. 29-Feb. 5, Chicago, Hotel Drake; Feb. 12-19, Los Angeles, Hotel Biltmore.

Dodge Adds Roadster With Rumble Seat

Car Will Sell at $945 and is Third Roadster in Regular Production

DETROIT, Aug. 11—The addition of a sport roadster with folding rumble seat and listing at $945 to the Dodge Brothers line marks the third roadster model to be in regular production. Improvements for better streamline have been made in the body lines of the new model with the introduction of the rumble seat, although the characteristic lines of the other two roadsters are retained.

Access to the rear seat is by two aluminum step plates on the forward side of the rear fender. Gray Spanish leather upholstery is used in the rear seat to match the interior of the front compartment. The general color scheme is similar to that on the special roadster model, the effect being a pheasant green lacquer body with a tan colored folding top. Nickel trim is used extensively in the new model, the windshield stanchions, lamp rims, radiator, top bow fittings and bumpers being so treated. The equipment on this model is practically the same as that on the special series.

Postoffice Awards Bids for Accessory Supplies

WASHINGTON, Aug. 12—Annual awards for the furnishing of automobile accessories for the Postal service were announced this week by the Post Office Department to cover the year beginning Jan. 1, 1927.

The brake lining contract was awarded to the United States Asbestos Co., New York, at 17 cents and 15 cents per foot; the Belden Mfg. Co., Chicago, trouble light cord at $44.75 per thousand feet; the Splitdorf Electrical Co., Bethlehem, Pa., spark plugs at 15 cents each; the St. Louis Rubber Cement Co., St. Louis, tire tape, 26 cents per pound.

To Show Light Trucks at New York Exhibit

NEW YORK, Aug. 12—Light trucks will be shown at the New York national show in January according to announcement by the National Automobile Chamber of Commerce, the exhibits being limited to trucks of a maximum overall length of 18½ ft. The truck exhibit will be staged on the third floor of Grand Central Palace, elevator accommodations making the size limitations necessary.

S. A. E. to Honor Warner

PHILADELPHIA, Aug. 9—A complimentary dinner to honor Edward P. Warner, recently appointed Assistant Secretary of the Navy in Charge of Aviation, is to be tendered by the Society of Automotive Engineers at the Penn Athletic Club here, on the closing evening of the Aeronautic Meeting.

GOODRICH CHECK IN MAIL 18 YEARS

AKRON, Aug. 11—Officials of the B. F. Goodrich Rubber Co. here have just been notified of the receipt at the New York Goodrich branch of a letter, mailed 18 years ago at a point less than a mile distant from the office.

The letter was caught in the mail chute in the old Mills building. There it reposed until wreckers, razing down the building, found it.

Enclosed was a check for $25.20, in payment for two inner tubes. The same tubes today would not cost more than $10.

Pratt & Whitney Test New Aircooled Engine

HARTFORD, CONN., Aug. 10—Tests of a new radial air-cooled engine have been practically completed here by the Pratt & Whitney Aircraft Co. This company which has just passed its first anniversary has to its credit the production within its first year of two radial engines for the United States Government. The "Wasp," the first engine produced, rated at 300 hp., has passed all its flight tests and is now going into production for the Navy. The "Hornet," the most recent development is an engine of somewhat higher horsepower, piston displacement being approximately 25 per cent higher than in the Wasp. Pratt and Whitney engines are noted chiefly for low weight per horsepower without the sacrifice of ruggedness. It is understood that the Hornet, as well as the Wasp weigh 1½ lbs. per horsepower.

38 Planes Make Stops at French Airport in Day

WASHINGTON, Aug. 12 — While impetus is being given the cause of commercial aviation in America by Secretary Hoover and Henry Ford through the reliability tests now being conducted, a cable from H. H. Kelly, Commercial Attache at Paris and former Chief of the Automotive Division of the Department of Commerce, gives an insight to aviation progress in Europe.

Le Bourget, Paris, Mr. Kelly informs the Department, is the largest air port in Europe. Some idea of the activities of the port is gotten from the fact that on July 31, 21 airplanes arrived, carrying 112 passengers and 5720 lb. of freight; and 17 airplanes departed, carrying 78 passengers and 9715 lb. of freight.

Wells Develops Fan Blade

CLEVELAND, Aug. 11—M. R. Wells, who has been research engineer for the Cleveland Automobile Co. for more than four years and for the Peerless Motor Car Co., for the previous 13 years, has severed his connections. He is devoting his time in the interests of the Welco fan blade for which he holds patents.

Retail Store Sales Show July Increase

Department Stores in All Sections Show Average Gain of 5.4 Per Cent

WASHINGTON, Aug. 11—Retail sales through department stores of the United States show an increase of 5.4 per cent in July this year over the same month of last year, according to preliminary reports to the Federal Reserve Board, just announced here.

Reports were compiled from 493 department and other retail stores, from all sections of the country, the average being 5.4 per cent. The highest increase was in Dallas, showing larger sales by 10.8 per cent. Larger sales than last year occurred at 330 of the reporting stores and smaller sales at 162. Sales of two of the larger mail order houses were 14.6 per cent larger than in July 1925, while sales through five and ten cent chain stores were 12 per cent larger than a year ago.

Bugatti's Again First in Spanish Grand Prix

SAN SEBASTIAN, SPAIN, July 26 (*by mail*)—The Italian driver Costantini, handling a non-supercharged 122 in. Bugatti, won the free-for-all Spanish Grand Prix on a road circuit here yesterday by covering 374½ miles at an average of 76.8 miles an hour. Costantini also set up the lap record at 83.8 miles an hour. Jules Goux on a Bugatti finished second, with Louis Wagner on Delage in third place and Minoia on Bugatti fourth.

Three 122 in. supercharged Delages, three non-supercharged Bugattis, Major Segrave on the supercharged 12-cylinder 244 in. Sunbeam and three amateurs on Bugattis, faced the starters. Developing 350 horsepower, the Sunbeam was the fastest car and got into the lead almost at the start, with the Delages chasing it. The Sunbeam went out after 60 miles with a broken ball race, but the fast pace caused the superchargers on two of the Delages to break up. With only one serious rival left, the Bugattis went out to win and first Costantini and then Goux passed the Delage driven by Wagner and Benoist.

Vauxhall Profits Lower

NEW YORK, Aug. 9—Net profits of Vauxhall Motors, which passed to General Motors control late in 1925, were $180,000 for the year ended Dec. 31, 1925, as against $250,000 in the preceding year.

Taylor on Engine Board

C. Fayette Taylor has been appointed a member of the committee on power plants of the National Advisory Committee for Aeronautics. Mr. Taylor is associate professor of the department of aeronautics at the Massachusetts Institute of Technology.

Tire Exports Lower Than in 1925 Period

Units Show Falling Off But Valuations Are Higher Due to Prices

AKRON, Aug. 11—Although the value of exports of automobile tires and other rubber goods from Akron factories during the first six months of 1926 increased about 30 per cent over the same period in 1925, volume in units was less than last year.

This year's increase in export values was chiefly the result of higher prices for tires and tubes. Furthermore, the latest report shows the trend of exports has been steadily downward since last March, whereas business at this time last year was increasing.

Some increase was noted in quantities of tire-repair materials, rubber footwear, mechanical rubber goods and reclaimed rubber.

Argentina was America's leading tire market for the half year, taking 106,206 casings, and 108,310 inner tubes. The United Kingdom took 71,139 casings; Cuba, 56,582; Japan, 37,321; Australia, 33,254; Brazil, 32,273, and Germany, 26,853.

Foreign sales of rubber footwear, of which the B. F. Goodrich and Firestone companies produce the bulk in this country, have increased during the past six months. An excellent business has been done in canvas rubber soled shoes, but the trade in rubber boots has declined. Sales of rubber heels, produced in huge quantities in Akron by Goodyear, Goodrich and Seiberling, have proceeded at a record rate. Trade in mechanical rubber goods has also been brisk.

Total rubber exports from the United States for the first half of this year were $32,944,401, it was reported.

Kelly Business Improves

SPRINGFIELD, OHIO, Aug. 9—Steadily improved earnings are reported by the Kelly-Springfield Truck & Bus Corp. Sales are increasing with the opening of several branches and the establishment of a larger factory sales force. The company is building a number of specially designed vehicles, among these a travelling grocery. Jack Detrick has been named chief engineer. Harry La Forge, now supervising the formation of company branches on the Pacific Coast, has been made branch supervisor with headquarters at the factory, and A. L. Alexander will be supervisor of branch sales, with headquarters in New York.

To Attend I. C. C. Hearing

CHARLOTTE, N. C., Aug. 7—John W. Hester, secretary-treasurer of the Carolina Motor Carriers Association, was named by the association's directors, in called meeting here, to represent the organization at a hearing which the Interstate Commerce Commission will hold Sept. 13 at Asheville, N. C.

FISK SEES RIGHT IN RUBBER ACTION

SEATTLE, WASH., Aug. 7—Reports of a plot by the British rubber monopoly to raise prices on American dealers was branded as a bugaboo without foundation in fact, by H. B. Fisk, president of the Fisk Tire Co., who arrived in Seattle this week on a vacation tour.

"England is too good a friend of ours to try anything like that," Mr. Fisk is reported as saying. "They want to see the rubber price stabilized. So do we. And it has been established. England wants her colonies to make a fair profit. That's all."

Tire prices will remain steady for a long time to come, said Mr. Fisk. Any reduction or increase will be in the ordinary course of production and will not be caused by any trouble in the rubber market, he declared.

He asserted the balloon tire, or rather, the semi-balloon type had come to stay.

New York Police Try Out New Car Recovery Plan

NEW YORK, Aug. 10—Police Commissioner McLaughlin has put into effect a new system for recovering stolen automobiles through cooperation of garagemen and used car dealers. Previously the owner reported the theft of his automobile to police headquarters. Then all precincts were notified and the policemen on their posts informed by telephone.

Under the present system every garage in the city is informed of the theft, make of car, license and motor number and a description of its condition within half an hour after the car is reported stolen. This is accomplished by the patrolman on post.

On the following day a printed list is mailed out from headquarters to every garage owner or used car dealer in the city, listing all motor cars, new or old, stolen or unaccounted for to date. There are 5000 such lists distributed daily. An effort is now being made by Commissioner McLaughlin to interest private garage owners in the system.

To Present New Bushing

NEW YORK, Aug. 7—M. F. Repusseau, president of the firm of Repusseau & Cie., leading French jobbers of automobile parts and accessories, has arrived in this country on the Paris. It is understood that M. Repusseau, who is accompanied by a British engineer, T. B. Andre, and a Belgian engineer, M. Thiry, plans to interest American industrialists in the manufacture of the new self-oiling bushing material Silentbloc, which is said to be particularly applicable to spring shackle bushings.

Philippines to Act on Large Tract Bill

Would Authorize 450,000 Acreage for Rubber to American and Philippine Growers

NEW YORK, Aug. 10—Under a bill now before the lower house of the Philippine Legislature, it is proposed to lease a maximum of 450,000 acres of land to any one corporation for rubber growing purposes. The bill is known as the Rubber Land Act. It stipulates that any such corporation must be 61 per cent owned by citizens of the United States or of the Philippines. The land may be leased for 75 years at the end of which time it reverts to the Phillippine government.

Under the provisions, 25 per cent of the land must be planted to rubber within 15 years after execution of the lease. After the sixth year the lessees would be required to pay an annual rental of 12 cents an acre. The bill would limit each lessee to not more than 50,000 acres in any one tract, but may hold a number of tracts up to the maximum, each to be separated from any other tract by the same lessee by a distance of one mile or more.

In his message opening the Legislature session, Governor General Wood urged that some measure be adopted which would expedite and facilitate rubber production. He cautioned that safeguards be incorporated which would insure to the people of the Philippines and to the United States, prior rights in the development, and the retention of control of the land and its development within the islands.

Pines Makes Sales Plans

CHICAGO, Aug. 9—The Pines Winterfront Co. has formulated merchandising and advertising plans which will include elaborate window displays and extensive advertising in automotive and national magazines and newspapers in 60 leading cities. These advertisements will carry the story of the investigation by automotive engineers as to the cause of motor troubles, and their advice to automobile owners.

The plans were divulged at a recent meeting in Chicago of 60 Winterfront distributors from all parts of the country. The company will endeavor to educate the public to the benefits of using automatic Winterfronts during the cool fall and spring months in addition to the winter season.

France Leads Tire Exports

WASHINGTON, Aug. 12—Out of 6,777,000 automobile casings exported during 1925 by eight principal manufacturing countries, the United States exported 1,770,000, it is announced by the Automotive Division of the Department of Commerce, ranking second to France which exported 1,872,000. During 1924 these countries exported 5,131,000 casings.

Sheet Steel Orders Exceed Mill Output

Good Rate of Automotive Consumption Indicated by Day-to-Day Buying

NEW YORK, Aug. 12—A steady flow of orders for sheets, strip steel, and cold-finished products indicates a very good rate of steel consumption by the automotive industries. In the absence of any contracting for deferred deliveries, finishing mills must adjust their operations from day to day to the exigencies of whatever urgent or convenient specifications come in each morning's mail or by wire, but, taking it week by week, orders more than cover the prevailing rate of operations.

Demand for full-finished automobile prime sheets appears to be somewhat in excess of the present output, and producers are unanimous in predicting upward price adjustments in the near future. Whether such a change in the base price will precede the general revision of sheet differentials remains to be seen. It is said that the new schedule, by which it is hoped to equalize production costs for the various gauges will be announced about Sept. 1.

Concessions in the black sheet market have virtually vanished. Competition continues keen, and there is more sales effort in evidence than the aggregate volume of demand would appear to necessitate, but, intensive as the rivalry among mills for individual orders is, it no longer takes the form of price-cutting. In some quarters the market for cold-rolled strip steel is characterized as a shade easier, but on the whole prices appear to be well maintained, although competition among cold-rolled strip steel producers is perhaps somewhat more intensive than in any other steel product.

Pig Iron—The valley market remains quiet, foundry iron having eased off to $17.50. Foreign iron, while less of an actual competitor, nevertheless exerts a restraining influence on advances which domestic blast furnace interests proclaim are essential if they are to make both ends meet. Automotive foundries are buying in routine tonnages.

Aluminum—Automotive demand is fair. Imports continue along entirely unchanged lines. Rising copper prices always impart an undertone of strength to the aluminum situation, but in the trade it is thought that copper has quite a way to travel upward before the rise will actually affect aluminum prices.

Copper—The red metal continues its march toward the 15-cent level. Statisticians assert that consumption during the first half of 1926 was 7 per cent greater than during the corresponding period of the preceding year.

Tin—With the market hovering close to the year's high, consumers are buying only what they urgently need, and speculators have the market to themselves.

Lead—Storage battery manufacturers are fairly well covered by contracts.

Zinc—Galvanizers are buying sparingly, but brass demand is fair.

A DETOUR BY ANY OTHER NAME——

MILWAUKEE, Aug. 9—The detour, bane of motorists everywhere, is a thing of the past in Wisconsin —so far as the name is concerned. By way of removing a thorn in the side of resident and out-of-state tourists, the Wisconsin state highway commission has decided to abandon the use of the word detour, and henceforth roads serving as temporary routes while trunk highways are being built or repaired will be known as "Temporary." The change is based almost entirely on the psychology of the situation, and in the brief time since it is in effect, appears to be more than justified in the more friendly attitude of tourists.

Salvador Defines Taxes to Yield Highway Funds

WASHINGTON, Aug. 12—All residents of the Republic of Salvador, whether natives or foreigners, and all citizens and foreigners residing abroad who own capital in the country are liable for the new highway tax of this Central American republic under the law of June 24, 1926, a copy of which has been received at the Department of State and just made public here. The new law supersedes that of April 30, 1925, which was less specific as to liability.

The new tax is expected to produce $400,000 a year, which will be used to construct and maintain a network of modern highways throughout the republic. Salvador is one of the most densely populated national areas of the Western Hemisphere, but its interior highways are relatively undeveloped. Work on the construction of the nation-wide highway development has already begun and is reported to be progressing satisfactorily.

Fix Schneider Race Date

WASHINGTON, Aug. 12 — The Schneider cup international high speed seaplane races will be held Oct. 24, at Hampton Roads, Virginia, the Navy Department announces here. Italy has entered three planes and the United States the same number. Great secrecy has been observed in regard to the Italian planes. Italy will use military pilots this year and five of the best aviators have been assigned to the Italian team which went into training June 1.

Toledo Employment High

TOLEDO, Aug. 9—Employment in Toledo automotive plants is holding up considerably better than in recent years. The Friday census of 51 Toledo plants showed 27,320 at work, or 3000 more workers than employed at the same time last year. Production at Willys-Overland remains on a high basis due to continuing large demand from dealers for the new Whippet model and Knight "70."

Parts Exports Gain; Engine Exports Off

Statistics Show 27.6 Per Cent of Automotive Shipments, Parts and Accessories

WASHINGTON, Aug. 12—The total value of parts and accessories, exclusive of engines and tires, exported from the United States during the first six months of this year was $50,300,383 or 27.6 per cent of the total automotive exports during that period amounting to $182,066,573. During the first half of 1925, $43,128,817 automobile parts were exported making up slightly less than 26 per cent of the combined automotive exports amounting to $166,457,821.

The Automotive Division of the Department of Commerce, in commenting on the statistics states that, viewing in another way the position of accessory and parts exports in relationship to total exports of automotive products, the value of foreign shipments of the former increased 16.6 per cent while that of the latter gained 9.4 per cent.

Automobile engine exports which are not included in the foregoing comparisons, except as a part of the total export figures, declined 8.3 per cent in number and 15 per cent in value when 85,886 valued at $8,215,152 were exported as compared with 93,680 valued at $9,661,270 during the first half of 1925.

Canadian exports of automobile parts increased slightly over 32 per cent over the six months period of last year, when they were valued at $2,461,718 as compared with the 1926 valuation of $3,252,602.

Motorcycle Prices Lower

MILWAUKEE, Aug. 7—Price reductions of $15 on the 74 cu. in. model "27 JD" and $5 on the 61 cu. in. model "27J" feature the announcement of the 1927 Harley-Davidson models. A number of improvements including the adoption of a water and weatherproof ignition unit and new angle tooth sprockets, eliminating whip and lash, have been made. Better ventilation and cooling of valve springs and stems is also provided by slotting the inlet valve housing caps. The "27 JD" model now lists at $320 and the "27 J" model is priced at $310.

To Show Ace Motorcycle

DETROIT, Aug. 9—Announcement of the 1927 Ace model has been made by the Michigan Motors Corp., and the first of these will be exhibited at the Rochester Motorcycle Rally beginning Aug. 13. The new model is featured by a pressure feed oiling system of new design, with a drilled crankshaft. Pistons are fitted with oil control rings in the lower groove and an oil pressure gage is provided on the right side of the gear case. Changes have also been made in the design of the piston pin which is now of the floating type.

Lower Lines Feature Davis Presentations

Refinements in Bodies and Chassis Give Better Looks and Performance

RICHMOND, IND., Aug. 10—The George W. Davis Motor Car Co. is continuing its 92 and 93 models with a number of refinements in bodies and chassis resulting in more attractive appearance and better performance.

On the 92 chassis, the height of the tops of the frame side rails from the ground has been reduced to 20 in. The Imperial sedan on this chassis is now 70 in. in overall height and its visual height has been further reduced by changes in the roof contour. At the windshield pillars the roof height has been reduced 4 in. while at the rear quarter pillars there is a 2 in. reduction. In addition, the visor has been extended by 1½ in. Seats are set lower and their depth has been increased. Upholstery is silk mohair with button tufted cushions. Door locks are of the remote control type and equipment includes smoking and vanity cases, two foot hassocks instead of the customary foot rail, lounge pillow for the rear seat, corded silk hand grips and a heater.

In the standard sedan on the 92 chassis, leg-room has been increased by lengthening the body and the low appearance has been accentuated by increasing the radius of the roof line at the rear. On this model, as well as on the Imperial sedan, the instrument board has been moved forward 4 in. to provide more driving room.

The maximum speed of the 92 models is now said to be in excess of 70 m.p.h. as the result of minor changes in the electrical equipment, manifolding and carburetion.

Aluminum pistons are now used in the model 93 engine and the crankshaft is fitted with a Lanchester dampener which is enclosed by the crankcase, both of these changes giving smoother performance. Modifications in the electrical equipment, carburetor and manifolding have also been made in this model with resultant improvement in economy and speed.

Both sedan and coupe models on this chassis are upholstered in royal cord, the cushions and backs being button tufted. In the sedan, there are two foot hassocks, lounge pillow, corded silk hand grips and adjustable shades for rear and quarter windows. The length of this body also has been increased to give more interior space.

A feature of both lines is that the fenders are finished in Duco in colors to match the bodies.

Siam Suitable for Rubber

WASHINGTON, Aug. 9—There are large areas of land believed suitable for rubber growing in Southern Siam, according to a dispatch just sent to the Rubber Section of the Department of Commerce by William W. Russell, American Minister to Siam. The dispatch explains that the rubber industry of Siam is 15 years old and has received an impetus during the past two years from increased demand and high prices. The present industry is chiefly confined to Patani, the region around Trang, and to some extent the vicinity of Singora, but successful cultivation is believed feasible as far north as Bandon, except in sections as near Setul and Nakora Britamarat, where the soil is too sandy.

Body Builders' Bids Cover Wide Range

WASHINGTON, Aug. 12—Names of the bidders on 35 standard mail truck bodies, together with the prices bid on mounted chassis have just been made public here by Thomas L. Degnan, Purchasing agent of the Post Office Department. They follow:

Fort Smith Body Co., Fort Smith, Ark., $380; Greenfield Bus Body Co., Greenfield, Ohio, $400; Ford Body Co., Greensboro, N. C., $300; Hugh Lyons & Co., Lansing, $483.75; Kratzer Carriage Co., Des Moines, $353.85; Woonsocket Mfg. Co., Providence, $305; Westchester Auto Body Co., White Plains, N. Y., $523; Andrew Murphy & Son, Inc., Omaha, $397.50; Hackney Bros., Inc., Wilson, N. C., $299.90; Mason Mfg. Co., Inc., Newport News, $258; Atlas Body Works, Bridgeport, $465; American Coach & Body Co., Cleveland, $382; Veenema & Wiegers, Inc., Paterson, N. J., $565; Biehl's Wagon & Auto Body Works, Reading, Pa., $514.75; Ahlnrand Carriage Co., Seymour, Ind., $248; Hoover Body Co., York, Pa., $519; Defiance Carriage Co., Defiance, $289.50; Fitzgibbon & Crisp, Inc., Trenton, N. J., $413; A. P. Rainey & Son, Westminster, Md., $341.38; Southland Motor & Body Corp., Nashville, Tenn., $305; George B. Mark, Inc., Brooklyn, $310; Kentucky Wagon Mfg. Co., Louisville, $199; American Body Co., Grand Prairie, Tex., $385; Izett Auto Body Co., Denver, $310; G. W. Goundrey & Son, Binghamton, N. Y., $415, and J. W. Rogers Mfg. Co., Minneapolis, $375.

Cuba Seeks Highway Bids

WASHINGTON, Aug. 7 — Bids for construction of the Cuban Central Highway system have been called for by the Department of Public Works of the Cuban government, according to a cable to the Department of Commerce from Commercial Attache Todd at Havana. This project is the largest road construction program south of the Rio Grande.

Mack Earnings at Peak

NEW YORK, Aug. 9—Second quarter earnings of Mack Trucks, Inc., set a new high quarterly mark of $3,025,799, equivalent to $4.48 a share on 611,515 shares of common stock. Profits for the first quarter of this year were $2,315,529, or $3.32 a share, on the stock, while in the second quarter of 1925 net profits were $2,898,979, or $7.69 a share, on 339,730 shares of stock then outstanding.

GMC Assets Reach $875,966,429 Total

Consolidation of Fisher Property Brings Corporation Near Billion Mark

NEW YORK, Aug. 9—Total assets of $875,966,429 are shown by General Motors after consolidation of Fisher Body Corp. according to its balance sheet as of June 30, 1926. Total current and working assets are $370,148,432 and total of fixed assets, $505,817,997. Surplus totals $209,727,656.

Current and working assets include cash $164,391,762; U. S. Government securities $28,865,228; temporary loans and marketable securities $2,604,000; sight drafts $20,082,122; notes receivable $3,893,666; accounts receivable $27,450,739 inventories $121,307,381. In fixed assets, value of real estate, plants and equipment is shown as $382,353,557; investment in affiliated and miscellaneous companies $67,438,360, and goodwill, patents, etc., $43,601,807.

Higher Insurance Rates Apply in Group of Cities

NEW YORK, Aug. 9—A scientific study of several years' experience has indicated the necessity for an increase in the rates of personal injury and liability on private passenger and commercial vehicles in several cities, according to a statement issued by the National Bureau of Casualty & Surety Underwriters. The rates have been made effective immediately.

The increases in Albany, Schenectady and Troy in New York are 25 per cent on private and commercial automobiles for personal injury and liability coverage.

Public liability rates in Philadelphia were raised approximately 10 per cent for private and commercial cars.

In Youngstown, Ohio, the rates have been raised approximately 30 per cent on all types of cars.

A revision has been made in New York City in rates for public liability and property damage for specific classes of passenger-carrying automobiles, which means buses principally. In New York State these must carry either an insurance policy or a bond.

A new schedule of rates, which has been accepted by the State Insurance Department, has been developed by the National Bureau. This schedule applies to public livery automobiles and buses only. These represent increases of approximately 40 per cent for public liability and 26 per cent for property damage.

Buenos Aires Firm Formed

NEW YORK, Aug. 7—A new importing and exporting firm has been formed by Vicent Capuano and Constantine C. Groppa, at Buenos Aires, to continue the business that was founded by V. Capuano. The company is operating throughout Argentina.

Men of the Industry and What They Are Doing

W. P. MacCracken Named Commercial Air Chief

President Coolidge announced the appointment of William P. MacCracken, Jr., of Chicago, to the post of Assistant Secretary of Commerce in charge of Aviation. Mr. MacCracken is secretary of the American Bar Association, chairman of its committee on the law of aeronautics, a governor of the National Aeronautic Association and counsel for National Air Transport, Inc. He is 37 years old and during the war served as a flying instructor.

Plans of Secretary Hoover, who fathered the idea in Congress that an Assistant Secretary of Aviation be appointed for the War, Navy and Commerce Departments, provide that the resources of the government shall be used in every way possible to encourage commercial aviation. Plans for the use of all Army, Navy and Post Office Department air fields, by commercial companies, have already been consummated.

Mr. MacCracken is expected to report for duty at once, it was announced by the Department.

A. T. Jackson on Foreign Trip

A. T. Jackson, vice-president and general sales manager of the Emerson-Brantingham Co., sailed this week for an extensive tour which will include visits to continental Europe, England, Scandinavia and later South America. He is making the trip in interests of the export trade of the company. Officials report that plant demand this year has been very gratifying and special demand has been received for the E-B tractor and tractor-drawn implements.

Otto Heins Gets Degree

Otto Heins, president of the Robert Bosch Magneto Co., New York, has been given the honorary degree of Doctor of Engineering by the Technical College of Aix la Chapelle, Germany, in recognition of his preeminent work in commercial production of mechanical devices and especially in the practical application of the results of scientific research.

Industry Gets Two Bills in 759 Passed by Congress

WASHINGTON, Aug. 11—A total of 17,812 bills were introduced in the first session of the 69th Congress which adjourned on July 3, of which number 759 were enacted into law—151 being signed by President Coolidge on the last day of the session.

Of the total number enacted the two major pieces of legislation affecting the automobile industry was the repeal of the excise taxes and the $150,000,000 Federal-Aid highway bill. The new session of the Senate has been set for Nov. 10. The House will reconvene on Dec. 6.

CHANDLER OFFICIALS ENTERTAIN DEALERS

More than 1800 dealers from all parts of the nation and Canada this week attended a two-day convention here called by the Chandler-Cleveland Motors Corp. to view the new models. Features of the confab were addresses by J. V. Whitbeck, vice-president in charge of engineering, and Sid Black, general sales manager. Mr. Whitbeck's address had to do with engineering features of the new models, while Mr. Black dwelt on the accomplishments and future of the Chandler-Cleveland organization.

Harrison Goldsmith, southern sales manager, discussed the new cars at length and F. C. Chandler, president, reviewed policies of the corporation. A display of 27 new Chandler models marked the meeting which terminated with a banquet in Hotel Hollenden.

Dexter Heads Division

The appointment of Harris E. Dexter, of New York City, as chief of the electrical equipment division of the Department of Commerce is announced here. Mr. Dexter will succeed R. A. Lundquist, who recently resigned from the service of the department to enter private business. Mr. Dexter recently has been employed as acting manager of the commercial division of the Servel corporation.

Mooney Returns Abroad

J. D. Mooney, vice-president, General Motors Corp., sailed today on the White Star liner, Majestic. He will inspect the corporation's foreign branches.

New Members Named

DETROIT, Aug. 11—Six manufacturers have been admitted to membership in the National Standard Parts Association by the board of directors. They are as follows:

Manufacturers—Link-Belt Co., Indianapolis; Marlin-Rockwell Corp., Jamestown, N. Y.; National Motor Bearing Co., Inc., San Francisco; Piston Ring Co., Muskegon, Mich.; Powell Muffler Co., Utica, N. Y.; U. S. Axle Co., Pottstown, Pa.

Postal Receipts Higher

WASHINGTON, Aug. 11 — Postal receipts of the 50 leading industrial cities of the country, always regarded as a barometer of current business, the Post Office Department announces this week show an increase of 6.41 per cent in July, 1926, over the same month last year. Totals for July this year were $3,073,127, compared with $2,888,069 last year.

Dodge Brothers Officers Direct Sales Meeting

Dodge Brothers' district sales representatives concluded their annual three days' sales meeting with a visit today to the Graham Brothers' plant, followed by a luncheon at the Evansville Country Club. The first two days' sessions had been held in Detroit.

The party of 40 men arrived here in three special railroad coaches this morning and were taken at once to the Graham Brothers' plant for inspection of production on the new Graham Brothers' two-ton truck. Following the luncheon the party departed in the special cars.

Factory executives who attended were John R. Lee, Dodge Brothers' general sales manager; F. R. Valpey, assistant general sales manager, in charge of trucks and commercial car sales; William R. Heilman, director of car and truck sales, and J. A. Merchant, assistant secretary Graham Brothers' division, Evansville.

Hensy Parrett, sales representative in South America; Leo J. Hoefling, sales representative in Australia, and E. A. Sonntag, sales representative in Europe, represented the foreign sales field.

Road Builders Association Takes Washington Quarters

WASHINGTON, Aug. 12 — Decision was reached here this week by the American Road Builders' Association to move all of its offices to this city and make it their international headquarters. The transfer will be made immediately and will bring to the National Capital several highway officials of world renown. The association's headquarters at present are divided between New York and Raleigh, N. C., with temporary offices in Chicago.

Charles M. Upham, director of the highway research board of the National Research Council will be in charge here with B. A. Birchland as secretary. The road builders' organization consists of highway officials, engineers and contractors of North, South and Central America and is the largest organization of its kind in the world.

P. O. Plans to Connect Philadelphia With West

PHILADELPHIA, Aug. 9—Beginning Sept. 4, an experimental air mail line will be operated between Philadelphia and New Brunswick by the Post Office Department, according to an announcement received from W. Irving Glover, second assistant post master general today. On this line, which will connect Philadelphia directly with the transcontinental air mail service, there will be used some of the new Douglas transports, 40 of which have just been purchased by the Post Office for air mail service.

Japan to Improve 14,500 Miles of Road

WASHINGTON, Aug. 12—The Automotive Division of the Department of Commerce is informed through cable dispatches that the home department in Japan has decided upon a tentative construction program for the improvement of highways, particularly for motor traffic, the cost of which is estimated to be about Yen 160,000,000, which amount is to be spread over a period of about 10 years.

The Japanese government will contribute towards this fund approximately Yen 50,000,000, the remainder to be supplied by the prefectures and cities benefiting. An investigation conducted in connection with this decision indicated that there are now about 53,000 miles of highways in Japan, of which 14,500 have been recommended as main roads for motor vehicles, and it is this mileage which will first be placed in condition for motor traffic.

Rickenbacker Inventories

DETROIT, Aug. 10—Rickenbacker Motor Co. is closed for 10 days for inventory. After that the company will resume its usual capacity production and reports orders coming in at a satisfactory rate.

Dutch Rubber Total 70,000 Tons

WASHINGTON, Aug. 7—The Rubber Division of the Department of Commerce official statistics show that exports of rubber from the Dutch East Indies Outer Possessions, not including Java and Madura, or the Sumatra East Coast, totaled 120,625 long tons in 1925. Allowing for moisture and other factors leaves a net production of at least 70,000 tons of dry rubber in 1925.

Industry Effect on Farm to be Subject of Survey

WASHINGTON, Aug. 10—A survey to determine the effect of automotive and other manufacturing industries, upon the welfare of the rural populations has been undertaken by the Bureau of Agricultural Economics in cooperation with the Agricultural Experiment Station of the University of Tennessee, the Department of Agriculture announces here. Headquarters for the survey will be at Knoxville, Tenn.

The survey will show just what relation the automobile, truck, tractor, radio, roads, etc., have on the farmer. Farmers' labor income, freedom from labor troubles, markets and marketing facilities, efficiency of schools and churches, health conditions, recreational facilities, morality and community spirit in manufacturing regions will be compared with the same factors in regions of similar agricultural possibilities in which little manufacturing is done.

B. & D. Builds Coast Branch

BALTIMORE, Aug. 7—Black & Decker Mfg. Co. has completed its Pacific Coast home at Oakland, Calif. It will be occupied Sept. 1. This building will be used as a branch office, service station and distributing warehouse. An interesting feature is a showroom where Black & Decker products will be set up in actual operation for demonstration to interested customers.

Financial Notes

Mullins Body Corp. shows a profit of $149,728 after expenses and interest, etc., but before Federal taxes, for the six months ended June 30, 1926. This is equivalent after preferred dividends to $1.11 per share earned on 100,000 shares of no par common stock, and compares with $191,444, or $1.52 a share, for the first half of 1925. The June quarter shows a profit of $42,711, which is equal to 23 cents a share on the common and compares with $107,017, or 87 cents a share, in the preceding quarter and $87,348, or 68 cents a share, in the June quarter of 1925.

Gardner Profits $87,305

ST. LOUIS, Aug. 7—Gardner Motor Co., Inc., reports a net profit of $87,305 after all deductions, for the first six months of the year, equivalent to 55 cents a share on the outstanding 155,000 shares of common stock. Gross sales for the six months totaled $2,846,713. Current assets total $1,041,275 while current liabilities total $139,108, a ratio of nearly eight to one. During the half year the company turned its inventory once a month.

Industry Fosters Library

WASHINGTON, Aug. 9.—A library on transportation, the first of its kind ever assembled, is being collected by the University of Michigan at Ann Arbor. Cost of same is being defrayed by the automobile industry, it is announced by the United States Bureau of Education, in charge of the work. To date $4000 has been contributed by General Motors, $4000 by Henry Ford and $4000 by Dodge Brothers, Inc.

Developments of the Week in Leading Motor Stocks

NEW YORK, Aug. 12—There was an erratic movement in the motor stocks during the past week with General Motors showing fluctuations over a wide range both up and down. The stock moved in an area of more than 25 points and indicated by its action that a large public following was taking part in its spectacular market movement. Many so-called light-waisted traders have been buying the stock with stop-loss orders placed several points under the market and this has had the effect of weakening its technical structure. Late on Monday an offering of around 5000 shares uncovered some of these orders and further large offerings at the opening on Tuesday brought about a precipitous decline of over 15½ points which represented market shrinkage in one day of $75,000,000. When bidders saw that the market was honeycombed with stop-loss orders, their bids were rapidly withdrawn, which hastened the decline.

Hudson Motor encountered a similar situation and sold off sharply from the day's high price.

A pool started activities in Hupp Motor and advanced the stock on heavy trading to new high levels in anticipation of an early increase in the dividend rate which is now $1 a share. There was also good buying in Continental Motors which advanced to a new high price on the movement. Buying in this issue is understood to be in anticipation of favorable developments to be announced in the near future. Company is said to be negotiating contracts with several large automobile producers for engines which it is expected will add considerably to its revenue.

Pierce-Arrow issues showed a sharp advance, particularly the preferred which moved up rapidly on reports that plans are being considered for liquidating the $40 in back dividends due on this stock. It is said that these dividends will be paid off in common stock, although nothing definite has been decided. Selling without the $40 in back dividends, the equivalent price on the preferred is under $80 a share and as the issue receives $8 annually in dividends, seems still to be on an attractive basis, notwithstanding its advance.

Activity in General Motors found further reflection in heavy buying of Yellow Truck & Coach issues, with which it is affiliated. Both the preferred and common stocks of this company were strong. Durant Motors on the Curb also enjoyed tremendous activity and more than doubled in price during the week. Many traders have been watching this issue for the first signs of activity on the assumption that W. C. Durant would soon turn his attention to making a favorable market in it.

Accessory issues were steady during the week. Both Stewart-Warner and Stromberg showed slight gains. There has been good buying recently of Electric Auto-Lite on the prospect of favorable earnings.

Federal Motor Truck was listed on the Stock Exchange and showed a good advance shortly after the initial trading. Federal is expected to earn about $6 a share on its stock this year and it is selling on a fairly attractive basis in comparison with other motor truck stocks. Mack advanced to new high ground on the move and White also bettered previous prices.

Rubber stocks showed little change and were comparatively inactive.—E. S.

Bolivia Makes Plans for Highway Growth

Building Activity Follows Missionary Work of Pan-American Highway Congress

WASHINGTON Aug. 9—A plan for the construction of an automobile road which would traverse the Republic of Bolivia, beginning at Puerto Acosta in the north and terminating at Villazon on the Argentine border, was presented at the first meeting of the newly organized La Paz Automobile Club, according to advices just received here from the American Legation at La Paz, Bolivia.

Considerable road building is in progress in the Department of La Paz, which, together with many other operations, is reported as the direct result of the missionary work accomplished in South and Central America by delegates to the Pan-American Highway Congress recently held in this territory.

The dispatch adds that work has been begun on a road from La Paz via Huarina to Copacabana on Lake Titicaca. At present this journey must be made by rail and water, requiring 18 hours. The new road will permit the trip to be made by automobile in a third of the time.

From the American Minister at Montevideo, the Automotive Division of the Department of Commerce also learns that it is proposed to construct a new automobile road between Montevideo and the free port of Colonia, the nearest city on the Uruguayan shore to Buenos Aires. The journey from Montevideo to Buenos Aires could be made in approximately six hours by the new road, a shortening of three hours from the fastest steamer time made between the two cities.

Road Association Studies Canada-Colombia Highway

WASHINGTON, Aug. 9—Preliminary steps for the construction of an international highway from Canada to Colombia were taken this week by the American Road Builders' Association in calling a meeting in January to discuss the route. The meeting will be held in Chicago. Invitations were sent to diplomatic representatives of Latin-American countries and all South and Central-American nations were urged to send government representatives.

The plan would link the highways of Canada, United States, Mexico, Panama and Colombia into an international improved thoroughfare. It would call for the construction of a bridge across the Panama Canal at the expense of the American government.

Hinson Buys New Plant

WATERLOO, IA., Aug. 7—The Hinson Mfg. Co., maker of tire covers, has purchased the Fred L. Kimball Co. plant for $55,750, and will establish a branch factory there.

ZEPPELIN TO BUILD LARGEST AIRSHIP

WASHINGTON, Aug. 12—Construction of an airship larger than any previously built is announced by the Zeppelin Works at Stuttgart, Germany, according to a report to the Automotive Division of the Department of Commerce from Consul Reynolds at Stuttgart. It has also confirmed the report that it plans to utilize as motor fuel in the new ship a new gas instead of benzine. The consul adds that while experiments with the new gas have not been entirely terminated little doubt seems to remain in the minds of the Zeppelin engineers that it can be used successfully and with decided advantages in the operation of lighter-than-air craft.

Poincare Proposes 50% Higher Car Tax

PARIS, Aug. 1 (*by mail*)—Automobile taxes have been increased about 50 per cent under the Poincare budget proposals. State taxes are still based on horsepower, which is calculated by formula taking into account bore, stroke and engine speed. From 1 to 5 hp. the rate is 72 francs, compared with 48; from 5 to 10 hp. the rate is 90 instead of 60 francs; from 10 to 20 hp. the rate is 108 instead of 72, and from 20 to 30 hp. it has been increased from 84 to 126 francs per horsepower. Each horsepower above 30 is taxed 144 francs. These are annual taxes which will go into force on Oct. 1.

Trucks are taxed at the same rate as passenger cars, the only exceptions being those using charcoal, wood, or coal producer gas plants. There is also a reduced rate for motor buses and taxicabs.

Battery Exports, 7 Per Cent

WASHINGTON, Aug. 7—Seven per cent of the approximately $100,000,000 worth of primary batteries manufactured by the United States during the last four years has been exported, according to announcement of the Electrical Equipment Division of the Department of Commerce. The value of the exported batteries totaled $6,871,713. Seventy-four per cent of the battery exports were taken by 16 countries. Exports to Mexico were valued at $786,665 and constituted 11.4 per cent of the total.

Export Tire Outlook Good

WASHINGTON, Aug. 12—Balloon tires are gaining favor at Naples and Stockholm according to the weekly news letter to the tire exporters from the Department of Commerce, just made public here. It further states there is a good outlook for American tire sales in London, Amsterdam, Swansea, (Wales), San Luis Potosi and Guadalajara, (Mexico).

German Grand Prix Won by Mercedes

Forty-Six Cars Vie for Honors in International Race Held Near Berlin

BERLIN, July 12 (*by mail*)—Rudolf Caracciola, driving an eight-cylinder Mercedes racer, won the race for the Grand Prize of Germany, which was run on the Avus track in the outskirts of Berlin on July 11. The race was over 250 miles and the time of the winner was 2:54:17.8, making his average speed 84.15 miles per hour. Second to finish was Chr. Riecken on a N. A. G. machine, whose time was 2:57:33.2, and who was followed by M. Cleer on an Alfa Romeo in 3:00:16.8 and Pierre Clause in a Bignan in 3:02:07.

The race was an international one and drew a lot of entrants, the German industry having made particular efforts to make a creditable showing. The 46 entries represented 22 German and 16 foreign makes, including Austrian, Italian and French.

In addition to the general classification, there was a classification according to piston displacement. In the class for cars up to 183 cu. in. the winner was Chr. Riecken, driving a N. A. G.; in the class for cars up to 122 cu. in. displacement, R. Caracciola, driving a Mercedes, and in the class up to 91½ cu. in. displacement, Georg Kloeble, driving a Neckarsulm, whose time was 3:07:27.

While the race was in progress rain began to fall, which made the track unusually slippery, as a result of which there was considerable skidding and a number of serious accidents occurred. There were two Mercedes cars in the race, the one driven by the winner, Caracciola, and the other driven by Rosenberger. The latter set the pace from the start and had a lead of several minutes, when, during the seventh round, his car began to skid and ran into the structure supporting the score board. Rosenberger escaped with light injuries, but one of the timekeepers was killed and a number of others were seriously injured.

The Grand Prize of Germany is a massive gold cup offered by the Automobile Club of Germany, and in addition to the cup the winner received a cash prize of 10,000 marks.

India Planning Highways

WASHINGTON, Aug. 7—Evidence of India's interest in highway construction is contained in a request to the Transportation Division of the Department of Commerce, by the Secretary of the Motor Trades Association at Calcutta, for information on highway financing. The association's communication states that a committee has been named to present to the government a plan for financing highway developments and requests detailed advice as to the forms of highway financing, source of revenue available and methods of amortization.

Ohio Power Company Develops Own Bus

Designed to Meet Special Requirements in Cities With Steep Grades

AKRON, Aug. 9—A bus said to be particularly suited for use in cities with steep grades has been assembled in the local shops of the Northern Ohio Power & Light Co., a bus operator on an extensive scale. The body is being built at Cleveland in the H. C. Kuhlman plant. The machine was designed by the engineering staff of the company, under the direction of P. V. C. See. It is of all-steel construction, will be known as the Northern Ohio bus, and will be made in sufficient numbers to meet the needs of the company and its subsidiaries. Seating 29 passengers, it has a wheelbase of 234 in., an overall chassis length of 320 in. and a frame height at the driver's seat of 27 in.

Since it entered the field of bus transportation four years ago, the Northern Ohio Power & Light Co. has accumulated a fleet of 250 buses, and while some of these were fairly well adapted to the service demands, others proved a failure. After investigating market conditions the company came to the conclusion that it could assemble a bus chassis better adapted to its needs and at a lower price than any of those it had purchased.

The engine of the new bus is a Waukesha six-cylinder of 4½ in. bore by 5¾ in. stroke, developing 115 hp. at 1800 r.p.m. It is fitted with a Robert Bosch magneto for ignition. A Long radiator of the tubular type with cast aluminum shell is mounted on the chassis frame in such a manner that it is protected against road shocks and frame weave. Care has been exercised to mount the engine in such a way that it can be easily removed from the chassis.

Standard Units in Assembly

The steering column is a Ross and the clutch and change speed gear are of Brown & Lipe make, the latter having four forward changes of gear. All-steel universal joints are used in the propeller shaft. The rear axle is by the Wisconsin Parts Co. and is of the double reduction type, with herringbone gears for silence. It is made with a reduction ratio of 6.1 for increased power in hill climbing and has a road clearance of 9 in., which is much more than that of the average city type bus. Two sets of concentric brake drums are fitted to the drive wheels, the service brakes, acting on the outer, larger drums, being actuated by compressed air by the Westinghouse system. The compressor used with this braking system also furnishes the air for operating the automatic bus doors. The front axle is a Shuler.

A 9¾-in. pressed channel frame is used, tied together with tubular and channel members. Exceptionally large gussets were installed so as to prevent loosening at the joints. Rear springs are of the two-stage type, the longer leaves being designed to give easy riding with light loads, while the shorter leaves are given a smaller amount of camber, so that they do not come into action until the spring is flattened out by heavy loads. They then come into play so as to prevent jars in the event the bus should be carrying a capacity load of passengers.

The front springs are anchored at their rear ends and have a flexible shackle connection with the shock absorber in front. Air shock absorbers are installed. Lighting and starting are by a Leece-Neville system with regulation for constant voltage, one of the L-N large type generators being used. With this system the bus can be operated even though the battery circuit may be open, and a tapering charge is given the battery. Fuel is carried in a 63-gal. tank at the rear.

Illinois Highway Mileage Now Totals Nearly 6000

SPRINGFIELD, ILL., Aug. 7—Completing nearly 6000 miles of paved highways in Illinois, the highway commission this week claimed to have broken three world's records; a year's record of 1230 miles of highway; a week's record of 63 miles and a day's record of 2669 ft. of 18-ft. highway, laid in one day from one concrete mixer.

In four years since 1921, 4472 miles of road were built, bringing the exact total to 5683 miles, beside 1885 miles of grading and 1722 bridges. The greater part of the work has been done under road bond issue. Nearly every important city or town in the state is on a hard road.

New Hupp-Murray Contract Covers Four-Years' Bodies

DETROIT, Aug. 7—A contract under which the Murray Body Corp. and its receiver, the Guardian Trust Co., agree to furnish 75 per cent of all automobile bodies required by the Hupp Motor Car Corp. during the next four years, has been approved in Federal Court here. Officials of the Guardian Trust Co. explained that the contract had to be signed by a Federal judge because of the receivership.

A claim of $294,794 was filed against the Murray Body Corp. by the Paige-Detroit Motor Car Co. earlier in the day.

Harris Buys Martin Interests

SPRINGFIELD, MASS., Aug. 6—The Harris Wheel Co. of East Hampton, Mass., has bought from C. H. Martin of this city, a controlling interest in the Martin Fifth Wheel and Tractor Co. It will continue to manufacture trailers and fifth wheels under the Martin patents.

Increase Belgian Tax

WASHINGTON, Aug. 6—An increase from six to ten per cent in the rate of sales and luxury taxes in Belgium, affecting automobiles, motorcycles and accessories, has been made, according to reports just received by the U. S. Department of Commerce.

Denmark Sees Buses Obsoleting Railways

Committee Recommends Abandonment of 34 Out of 40 Proposed Lines

WASHINGTON, Aug. 7—The automobile is fast displacing the steam railway in Denmark. So much so is this a fact, that a report has just been made by a specially appointed commission, to the Danish Parliament, recommending that 34 of 40 projects for new railway construction, be abandoned. Before they can be completed and made to pay they will become obsolete, the report declares.

The report of the railway commission, forwarded to the Department of Commerce by Commercial Attache Sorensen, at Copenhagen, which will be of interest to automobile manufacturers, is as follows:

"The Commission recommends that 34 of the 40 railroad projects which have received the approval of the Danish Parliament, and on some of which work has already begun, be abandoned outright, and that in the case of three others, construction be made provisional, thus leaving only three roads of the projected forty.

"While the prime reason for the commission's recommendations to reduce railroad construction is said in Denmark to be the rapid development in recent years of Danish bus traffic, its report does not take up for consideration the pressing questions in connection with bus transportation, such as coordination of bus and railroad traffic, establishment of State bus routes, and State support of bus traffic through subvention. Consideration of these questions has been left to the Bus Route Subcommittee, appointed in 1925, whose report is expected, in Denmark, to be submitted soon."

Brazil Changes Tire Ruling

WASHINGTON, Aug. 7—Effective at once, balloon tires for light trucks, imported into Brazil, will be subject to a 15 per cent ad valorem duty, instead of the prevailing 5 per cent on balloon tires on passenger cars. Ruling to this effect has been sent to the U. S. Department of Commerce by the Commercial attache at Rio de Janeiro. Tires on imported truck chassis will be admitted at 5 per cent duty.

The change in the import regulations was brought about by importers bringing in balloon tires for trucks, but declaring them for use on passenger cars, thus securing the lower rate. Inasmuch as the custom house has no check on consumption, it was decided to issue the new ruling.

Austria Revises Tariff

WASHINGTON, Aug. 7—The Austrian automotive sales tax of 8 per cent on imported cars, has been reduced to 7 per cent of the duty-paid value, according to cable to the automotive division of the U. S. Department of Commerce.

New Watson Factory to Expand Capacity

PHILADELPHIA, Aug. 9—The John Warren Watson Co. will occupy the new factory and office building now under erection at Bridesburg, near here, on Jan. 1, which will make possible a greatly enlarged Stabilator production schedule in 1927. The new factory is of one floor construction with saw-tooth roof, measures 780 x 120 ft. and has its own power house.

Facilities of the new factory will be much greater than in the present two plants now used by the company. Both of these will be continued in operation up to the first of the year when they will be discontinued. Equipment and machinery of the new plant will be new, much of the present equipment being scrapped. A railroad siding runs the full length of the building. The general offices will be in the front of the plant.

Production of the company has grown from 886 sets in its first manufacturing year, to an approximate 150,000 sets in 1925. This will be doubled in 1926, according to factory estimate. Gross sales from Jan. 1 to May 22 this year totaled $1,377,000 which compares with $561.000 for the same period in 1925.

P. O. Seeks Truck Bid

WASHINGTON, Aug. 7—Sealed bids for the supplying of 50 automobile trailer-trucks will be opened by the Post Office Department on Aug. 25. According to the Department's specifications, the trucks are to be constructed in accordance with blueprints which will be forwarded to prospective bidders by the purchasing agent. Bids in each instance must be signed by an authorized officer of the company, to be considered by the Department.

Coming Feature Issues of Chilton Class Journal Publications

Sept. 15—Commercial Car Journal—Annual Bus Issue.

Sept. 30—Automotive Industries—Annual Production Issue.

Pikes Peak Hill Climb to be Run on Labor Day

COLORADO SPRINGS, Aug. 7—The eighth annual Pikes Peak Hill Climb race will be held on Labor Day, Sept. 6, under the rules and jurisdiction of the American Automobile Association. The entrants are handicapped by weight according to piston displacement.

The first cash prize is $1500, second cash prize $350, and third cash prize $250.

The Penrose Trophy, a mammoth cup secured by Spencer Penrose in England, of great antique as well as intrinsic value, goes to the custody of the winner of first place, under the terms of the deed of gift.

New Departure Adds Units

NEW YORK, Aug. 7—The New Departure Mfg. Co. has increased the forge plant machine ship by an addition of 250 ft. by 75 ft. making the building 525 ft. long. The forge shop is larger still, having dimensions of 600 ft. by 125 ft. This plant now contains a total of 65 modern forging machines, which have a production capacity of between 140,000 and 150,000 ball bearings a day. Extensions also include a new rolling mill building 150 ft. by 75 ft., which also is being equipped with modern rolling mill equipment.

Ship Lines Oppose Dealer Re-Routing

NEW YORK, Aug. 9—Designation by factory officials of steamship lines to carry export shipments is necessary if certain advantageous ocean freight rates on automobiles and parts are to be renewed, according to J. S. Marvin, chairman of the Traffic Managers Conference of the National Automobile Chamber of Commerce.

Lines to Antwerp, Rotterdam, Amsterdam, Hamburg and Bremen have freight contracts with manufacturers on this side and dealers and distributors abroad that expire Aug. 31. These cannot be renewed, the steamship companies have advised, unless the routing control is left with the manufacturer. Interference with the routing by dealers abroad has made the contracts unsatisfactory.

The export rate committee of the chamber and the steamship conference lines will discuss the situation.

Fire Truck Sales Steady

WASHINGTON, Aug. 9—June shipment of fire extinguishing motor equipment, as reported to the Department of Commerce by the manufacturers totaled 141 pieces, as compared with 101 in May and 145 in June, 1925. Reports are based on sales of 22 companies manufacturing motor apparatus. Value of the equipment is not included in the Department's compilation.

Road Research Meetings

WASHINGTON, Aug. 6—The Highway Research Board of the National Research Council, announce that its sixth annual meeting will be held in the National Academy of Sciences, on Dec. 2-3. Meetings of the Research Committees will be held between Sept. 1 and 15.

Calendar of Coming Events

SHOWS

Boston, Mass. .....Sept. 27-Oct. 2
Radio Exposition, Mechanics' Bldg.

Brussels .....Dec.

Buenos Aires .....Dec. 7-20
Ninth Argentine Automobile Show, Palermo Park.

Chicago .....Sept. 20-24
National Steel and Mechanical Tool Exposition, Municipal Pier, American Society for Steel Treating.

Chicago.....Sept. 27-Oct. 2
National Radio Exposition.

Chicago .....Nov. 8-13
Coliseum, Automotive Equipment Association.

Chicago .....Nov. 15-19
Hotel Sherman, National Standard Parts Association.

Chicago .....Jan. 29-Feb. 5
National, Coliseum, National Automobile Chamber of Commerce.

Cleveland .....Oct. 4-8
Public Auditorium and Annex, American Electric Railway Association.

London .....Oct. 4-9
Olympia Motor Cycle.

London .....Oct. 21-30

Milan .....Sept. 1-20
Exposition.

Milan .....Sept. 6-13
Fifth International Road Congress.

New Haven .....Sept. 7-10
Machine Tool Exhibition.

New York .....Sept. 13-18
Radio World's Fair, Madison Square Garden.

New York .....Jan. 8-15
National, Grand Central Palace, National Automobile Chamber of Commerce.

Paris .....Oct. 7-17
Auto Salon, Grand Palais.

Paris .....Dec. 3-19
International Aeronautic Exposition, Grand Palais.

Prague .....Sept.

San Francisco.....Aug. 21-28
Pacific Radio Exposition, Exposition Auditorium.

CONVENTIONS

American Electric Railway Association, Public Auditorium and Annex, Cleveland .....Oct. 4-8

American Society for Steel Treating, Municipal Pier, Chicago.....Sept. 20-24

Associated Manufacturers of Fabric Auto Equipment, Inc., La Salle Hotel, Chicago .....Nov. 13

Automotive Electric Association, Delaware Water Gap .....Sept. 13-16

Automotive Equipment Association, Coliseum, Chicago .....Nov. 8-13

National Standard Parts Association, Hotel Sherman, Chicago.....Nov. 15-19

National Tire Dealers Association, Inc., Memphis, Tenn. .....Nov. 16-18

S. A. E. MEETINGS

National

Boston, Nov. 16-18, National Transportation and Service.

Chicago, Sept. 21-23, Production Engineering, Hotel Sherman.

Philadelphia, Sept. 2-3, Aeronautical.

RACES

Altoona .....Sept. 6

Atlantic City .....Sept. 25

Charlotte, N. C. .....Aug. 21

Dallas, Texas .....Nov. 11

Laurel, Md. .....Oct. 23

Los Angeles .....Nov. 25

Philadelphia .....Sept. 4-11
National Air Races.

Salem, N. H. .....Oct. 12